1882.

Board of Revenue,

MADRAS.

Proceedings, 23rd *Sept.* 1882, *No.* 2360.

Submitting to Government, with the Board's review thereon, the *Annual Report on Government Agricultural Operations* in the Madras Presidency for 1881-82 by the Superintendent, Government Farms.

ANNUAL REPORT

OF THE

DEPARTMENT OF REVENUE SETTLEMENT AND AGRICULTURE

FOR

1882-83.

MADRAS:
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1884.

DEPARTMENT OF REVENUE SETTLEMENT AND AGRICULTURAL.
MADRAS, 10*th September* 1883.

No. 1205 A.

From

W. WILSON, Esq.,
Director of Revenue Settlement and Agriculture,
Madras,

To

H. E. STOKES, Esq.,
Secretary to Government, Revenue Department,
through the Board of Revenue.

SIR,

I have the honor to submit the annual report of the Department of Revenue Settlement and Agriculture for 1882-83.

2. In the latter part of 1882, the appointment of Director of Revenue Settlement, which was abolished in 1879 on financial considerations, was revived and its duties conjoined with those of the newly created Director of Agriculture. To the Director was assigned also the compilation of the irrigation accounts of the presidency, and more lately the charge of the Inam Department; he has further been appointed a temporary and additional Member of the Board of Revenue, the constitution and working of which have been recently modified by a legal enactment.

3. The operations of the Settlement, Inam and Irrigation Departments have been already separately reported on, but in reference to paragraph 1 of G.O., No. 956, dated 7th ultimo, I shall, in order to make this report complete in itself, again very briefly review them here.

4. *Revenue Settlement Department.*—Up to the end of 1882-83, assessments had been revised completely in ten and partly in six of the twenty-one districts of the presidency. The acreage dealt with was Acres 12,803,674, being a survey excess of Acres 1,199,423 or 10 per cent. on the areas recorded in the revenue accounts. The financial result of the settlement was an increase of Rs. 12,01,580 or 5·8 per cent. on the old revenue assessments.

The total cost, including survey, to date was Rs. 2,11,87,174, on which the increased revenue of Rs. 12,01,580 represents a return of 5·7 per cent. The cost for the year of settlement operations was Rs. 2,32,177, or Rs. 2,823 less than the budget grant of Rs. 2,35,000; the area classified was 1,094 square miles in three districts.

The survey cost in the year Rs. 6,03,607, the area surveyed for revenue purposes being 1,256 square miles, and for topographical purposes 1,878 square miles: operations extended to ten districts.

5. *Inam Department.*—From its first beginning in 1859 till the end of last year this department had dealt with 438,844 inams, embracing an area of 6,680,233 acres, assessed at Rs. 1,05,13,334. In addition to the old jodi of Rs. 9,38,944 assessed on these inams, there has been imposed on them, as the price of enfranchisement, an additional quit-rent of Rs. 16,05,425. The total cost of the department to date was Rs. 13,81,699, or Rs. 3,62,837 less than the amount for a single year of the additional assessments it has imposed.

The operations of the year included 5,970 inams, embracing 110,427 acres, assessed at Rs. 1,01,014, subject to a jodi of Rs. 1,582, in addition to which there was imposed on them, as the price of enfranchisement, a quit-rent of Rs. 56,822. The cost of the department for the year was Rs. 8,711.

6. *Irrigation Accounts.*—The irrigation revenue accounts of the nine systems for which capital and revenue accounts are kept have been completed to date and submitted to Government for all systems but the Madras Water Works, the account of which also will be completed and submitted at an early date. The accounts for the past year have been already separately submitted for all nine systems. Of the nine systems, five—the Godávari, Kistna, Pennér, Cauvery and Srívaikuntham anicuts—are classed as Productive Public Works, and the other four—the Pálár and Pelandorai anicuts, the Chembrambakam tank and the Madras Water Works—as agricultural.

The following statement shows the present financial position of each work :—

System.	Capital Outlay.		Revenue Receipts.		Working Expenses.	
	In this Year.	Up to the end of this Year.	In this Year.	Up to the end of this Year.	In this Year.	Up to the end of this Year.
1	2	3	4	5	6	7
	RS.	RS.	RS.	RS.	RS.	RS.
I. Productive Public Works for which Capital and Revenue Accounts are kept—						
1. Godávari Anicut	2,24,909	1,10,20,241	15,45,198	3,21,40,280	3,34,170	83,09,475
2. Kistna do.	2,12,849	63,30,628	8,69,678	1,49,77,637	2,84,416	46,01,857
3. Pennér do.	..	16,65,159	1,20,627	13,61,115	17,496	1,51,356
4. Cauvery do.	30,961	11,50,138	6,56,267	1,38,42,450	33,995	**1,85,934**
5. Srívaikuntham do.	13,984	13,12,135	91,264	6,11,579	18,246	2,64,497
II. Agricultural Works for which Capital and Revenue Accounts are kept—						
1. Pálár Anicut	**1,42,862**	16,80,965	1,09,891	13,23,351	38,833	7,41,596
2. Pelandorai do.	22,694	3,87,028	5,270	23,767	47,761	2,19,635
3. Chembrambakam Tank ..	**211**	7,36,589	30,383	2,95,835	**2,919**	30,163
4. Madras Water-supply and Irrigation Project	18,053	17,09,997	42,348	1,16,862	12,129	1,27,480

System.	Balance of Revenue.	Interest Charges.		Balance of Income.	Percentage of Surplus Revenue on Capital Expenditure.
		In this Year.	Up to the end of this Year.		
	8	9	10	11	12
	RS.	RS.	RS.	RS.	RS.
I. Productive Public Works for which Capital and Revenue Accounts are kept—					
1. Godávari Anicut	2,38,30,805	3,65,198	81,74,910	1,56,55,895	142·1
2. Kistna do.	1,03,75,780	2,30,972	48,19,225	55,56,555	87·8
3. Pennér do.	12,09,759	57,154	10,74,532	1,35,227	8·1
4. Cauvery do.	1,40,28,384	41,297	11,60,217	1,28,68,167	1118·8
5. Srívaikuntham do.	3,47,082	49,250	5,92,518	**2,45,436**	..
II. Agricultural works for which Capital and Revenue Accounts are kept—					
1. Pálár Anicut	5,81,755	66,477		**7,89,416**	
2. Pelandorai do.	**1,95,868**	13,699	13,71,171	**2,95,073**	..
3. Chembrambakam Tank ..	2,65,672	24,983	99,205	**20,456**	..
4. Madras Water-supply and Irrigation Project	**—10,618**	58,564	*2,86,128 8,40,719	**—8,51,337**	.. ..

The figures in thick black type are *minus* figures.

From this it will appear that the Cauvery has repaid in surplus revenue 1118·8 per cent. on the expenditure on improvements, the Godávari 142·1 per cent., the Kistna 87·8 per cent., and the Pennér 8·1 per cent. In other words, the Cauvery has repaid in surplus revenue more than eleven times the money spent on it, the Godávari nearly one-and-a-half times, and the Kistna all but one-eighth of its cost. Except these and the Pennér anicut, no other system has yet earned any surplus revenue, and it is extremely doubtful on the figures whether two of them, the Pálár and Pelandorai anicuts, ever will.

The total revenue depending on these works is Rs. 87,94,861, of which, Rs. 24,27,421 represent land assessments and Rs. 63,67,440 water rates.

7. The irrigation works in the presidency, for which neither capital nor revenue accounts are kept, are divided into two classes :—

(1) Those for which individually a continuous revenue record is maintained.
(2) Those for which individually no such records are maintained and which are accounted for in the lump.

8. The former class includes sixty-two works in nine districts. The number included in the latter class has not yet been determined. A special establishment is now engaged in bringing up to date the revenue accounts of the continuous record works, and such progress has been made that it is expected that the accounts of all of them will be submitted to Government by the 31st March 1884 at furthest.

9. For the more exact determination of the value to the public revenue of the minor irrigation works of the presidency, I thought it desirable that the assessments dependent on them should be analysed and distributed between "land" and "water" in the same way as the assessments under capital and revenue and continuous record works are. I sent printed copies of instructions and forms therefore to all districts but Nílgiris, Malabar and Canara and arranged that the village accounts should be forwarded direct from the taluks to this office, the only scrutiny required of Tahsildars being to see that the accounts corresponded with the Jamabandi settlement. We have thus got information regarding the nature, situation and capacity of every irrigation works in the presidency having an ayacut of 10 acres and over. The returns are being now tabulated, and will, it is hoped, be laid before Government by the 30th November 1883. The novelty of the work, and, in some cases, non-apprehension of the instructions, led to some delay; but the instructions have been generally well understood, and it is anticipated that from next year onwards tabulated returns for all works in the presidency will be submitted as early as those of the capital and revenue account works now are.

10. On irrigation works for which capital and revenue accounts are not kept there now depends in the districts, excluding Nílgiris, Malabar and Canara, a revenue of one hundred and twelve and three-quarter lakhs of rupees (G.O., No.602-I., dated 1st August 1883).

11. *I.—Department of Agriculture—Organization and Maintenance of Village Records.*—In my letter, No. 1, dated 26th December 1882, recorded in G.O., No. 956, dated 7th August 1883, I pointed out that there has for many years existed in this presidency a highly organized system of village record. But, though very full, it is not complete; its chief defect so far as matter is concerned being the want of any record of the quantity and value of each year's produce.

To remedy this defect, I suggested (Board's Proceedings, No. 687, dated 9th March 1883) the addition of a couple of columns in the village register, as I thought there could be no difficulty in effecting for a Government village by means of an administrative order what a zemindary curnam is bound to do by law (Madras Regulation 29 of 1802, Section 11, Clauses 5 and 6). The Board at first assented, but in subsequent Proceedings (No. 1161, dated 23rd April 1883) cancelled their former order, being, on further consideration, of opinion that the labor which it was proposed to impose on village curnams would be unduly heavy and that the duty could not properly be discharged by them.

12. The matter has been further discussed in connection with a despatch from the Government of India, No. 25, dated 19th April 1883, regarding the best way of getting trustworthy information about the quantity of produce raised in each year, but no final decision has been yet arrived at.

13. II.—*Analysis of Districts.*—This is understood to mean the compilation of a Gazetteer or record of standing information regarding the agricultural conditions of each district in the presidency. For such records there is already available a great mass of information in the archives of the Government and in the records of the Board and of this office, and the statistics of irrigation now in process of compilation will form the basis of the analysis so far as irrigation is concerned. I propose to draw up a skeleton sketch of the information required and to employ certain selected men of the irrigation establishment in filling in the details for the several districts as soon as the closed tabulation of the continuous records and other works will allow of their temporary employment on other duty. The districts will be taken up in the order of their

liability to famine. It is possible that additional establishments may be required for a time, but I do not intend to ask for them till it is demonstrated that the work cannot be done without them.

14. III.—*System of Collection of Revenue and Rental in precarious Tracts.*—In this presidency Government has nothing to do with the collection of rental: that is matter of contract between landlord and tenant. The system of collection of revenue is the same throughout the presidency. Where water fails for irrigation, the assessment is remitted, unless the land be cultivated with a dry crop, in which case the appropriate dry assessment of the land only is collected. In seasons of general and widespread drought, the assessments on dry lands are also remitted. In famine times it has been the more usual course to suspend collections, but suspension of revenue not unfrequently ends in its remission.

15. A discussion of some interest took place during the year in connection with a question nearly allied to this subject on a despatch, No. 15-R, dated 3rd May 1882, from the Government of India, regarding the distribution over the year of the instalments of land revenue payable to Government. It was suggested that kist should follow crop, and at a considerable interval so as not to force all ryots into the market at once, and that the number of instalments should be reduced, those for dry lands being three in number, corresponding with the three well-defined crop seasons of the presidency ("punasa, pedda and paira"), and those for wet, being one for single-cropped land and two for double-cropped. It was argued that a multiplicity of kists was of no real benefit to the ryot unless each of them represented a crop reaped and sold, while the interval which it was proposed to allow between crop and kist would give the ryot ample time to sell his crop as the market suited. The Board of Revenue thought that there was no occasion to disturb the existing arrangements which had but recently been fixed after long discussion, and Government concurred. The consequence is, that in many parts of the presidency the first kist is due in December before the first crop is reaped in January, and this, I observe, has been subject of complaint to His Excellency the Governor during some of his recent tours. There can be no question in my opinion that by collecting assessments before crops are reaped Government forces its ryots into the hands of the money-lenders.

16. IV.—*Measures of Protection including Arboriculture.*—The chief protective measures of the year were in irrigation, the sanction of the Rooshkuliya, Periyár and Baroor projects. The first affects the Berhampore and part of the Goomsur Taluks of Ganjam, and is estimated to irrigate 120,000 acres at a cost of Rs. 28,60,239. The second is intended to improve and extend the irrigation under the Vaigai river of Madura by diverting to it part of the perennial waters of the Periyár which now flow unutilized to the sea through the Travancore country. It is estimated that it will affect 101,000 acres and cost Rs. 64,41,463. The Baroor project is not merely a protective work but it is classed also as a productive one, the anicut dams the Ponniár river in the Kistnagiri taluk of Salem and is estimated to irrigate Acres 6,887 at a cost of Rs. 3,33,793. In all these projects part of the area embraced by the schemes is already irrigated.

17. But even greater in importance than these works of irrigation is the scheme of light railways for the presidency that has been submitted for the consideration and approval of the Secretary of State. These railways have been designed to connect the inland parts of the presidency, where irrigation always fails under protracted drought and which experience has proved to be most subject to famine, with the sea and the surplus-food-producing deltas of our principal rivers.

18. With arboriculture this department has at present but little to do. Forests are separately administered and road avenues are under the control of Local Fund Boards. In reference to paragraph 15 of the letter of the Government of India, No. 445-A, dated 14th May, to the Government of the North-Western Provinces, embodied in their letter to Madras, No. 31-A, dated 14th May 1883, I may mention that, when Collector of Coimbatore and just before I left it in 1881, I issued a circular inviting the help and co-operation of the people as the persons most interested in the creation and maintenance of avenues throughout the district. The circular was published in the *Coimbatore District Gazette* of the 27th August 1881, and was besides

specially distributed to every village in the district. This seemed to me to be the best if not the only way by which road avenues in Coimbatore could be created. The circular I am told fell dead.

19. Attention has been directed to the economic use and value of the divi-divi tree; and the olive and Spanish chestnut, which have been grown successfully at Kandeish, have been recommended to the notice of the Collectors of Nílgiris, Coimbatore, Salem, Madura, Tinnevelly, Bellary, Vizagapatam and Ganjam.

20. *V.—Agricultural Experiments including Farms and Introduction of Agricultural Improvements.*—I have joined items 5 and 6 of the Government of India's programme, as there seems no sufficient reason for disjoining such manifestly connected matters, and it would be for the purpose of this report inconvenient to do so.

21. *The Government School and Farm at Saidápet.*—Mr. Robertson, who in addition to his duties as Superintendent of the Government Farm, was during the year appointed also Agricultural Reporter to Government, divides his report, which is an enclosure to this, into four parts, dealing respectively with the School of Agriculture, District operations, the Experimental Farm at Saidápet and Departmental matters. These will be noticed in their order and first of the—

22. *(a) School of Agriculture.*—This is not controlled in this department, but it is noted that the number of students increased from forty-one at the beginning to sixty-nine at the end of the year, while it was expected that there would be at least one hundred in attendance next session. Greater attention, it is stated, was given to practical training in all the branches of instruction, but it is questionable whether the contemplated increase in the number of students will not seriously interfere with their training in practical agriculture. When there were far fewer students, it was found that the "weakest part of the curriculum was the training that could be given in practical agriculture," the number to be taught making individual instruction difficult if not impossible (Mr. Acting Superintendent C. Benson's letter to the Director of Public Instruction, No. 783, dated 10th July 1879). It has been questioned whether at a School of Agriculture practical agriculture should be taught at all, and quite recently it has been proposed to Government that the school should be a science school only, the connexion between it and the Farm, or, in other words, between theoretical and practical agriculture being entirely severed, the one being controlled by the Director of Public Instruction, the other managed in the Department of Agriculture.

23. *(b.) District Operations.*—Mr. Robertson's tour, the Madras Exhibition, the Beheea Sugar Mill and Seed distribution have all been subjects of separate reports and need not be again noticed here further than to remark that the Exhibition, though falling very far short of perfection in the matter of its arrangements, was thought to be on the whole a success, that the Beheea Mill, so far as trials in Bellary go, has proved an unqualified success, and that the results of seed distribution in the year were disappointing.

24. There was no ploughing match during the year, either at the presidency or in the provinces. It had been intended to hold one at Madras concurrently with the Exhibition, but no ground in suitable condition could then be found, and the intention was abandoned.

25. The vegetable parasite known in Telugu as "Bodu," alluded to in paragraph 7, page 8, of Mr. Robertson's report, as having attacked and very seriously injured the tobacco crop in the Godávari lunkas has been identified by Professor Lawson as the "*Philipœa Indica.*" The existence of the pest was brought to my notice later on by Messrs. Arbuthnot and Co., and I took immediate steps for its identification and the discovery of remedies. Advantage was taken of the school vacation to depute the Assistant Superintendent, Mr. Benson, to the Godávari to investigate among other things this matter so far as circumstances permitted at that time of year. His report has been submitted and will be published with a separate note. The parasite attacks also the brinjal which belongs to the same natural order as tabacco. It does not confine its attacks, however, to the Solanaceæ, for I heard from the Collector yesterday that it attacks also turmeric—one of the ginger family. Nor is it confined to the lunkas as was originally supposed. It attacks also the tobacco of the upland villages. The fact that the parasite does not confine itself to plants of the same natural order

makes the suggested remedy of starving it out by change of crop somewhat difficult of application. The native growers moreover are too apathetic apparently to adopt this remedy even were it sure, for the crop they get, inferior though it be, both in quantity and quality, is highly remunerative. This tobacco parasite seems to be identical with the *Philipœa Calotropidis* of the Punjab, figured and described in Mr. Baden-Powell's "Products of the Punjab," where it is used as a cattle fodder. The reports as to its use as a fodder in the Godávari are conflicting, some being to the effect that cattle eat it freely, while others aver that they will not touch it.

26. *(c) The Experimental Farm at Saidápet.*—The rainfall of the year was average in amount, but was badly distributed; more than half fell in the one month of November. The result was, scanty crops and grain of very inferior quality. The crops generally were attacked with rust, and the paddy suffered from a fly, to which the excessive damp seems to have been favorable. The farm comprises some 300 acres, but of this, only Acres 139 were under crop, 39 acres more being under timber—chiefly casuarina. The uncropped lands of the farm are for the most part unfit for ordinary tillage, but they may be improved by planting and become in time fit for cultivation. Of the cropped area, Acres 71·26 or rather more than half were under fodder crops, Acres 21·14 under unirrigated corn crops, Acres 11·30 under irrigated cereals, and Acres 35·31 under industrial and other crops.

27. (1) *Fodder Crops.*—Of the fodder crops the best and at the same time most easily grown are guinea-grass, planter's friend, cumboo and horse-gram. Buffalo grass failed, and is pronounced unsuited to this part of India. The same must now, I think, be finally said of "reana luxurians;" it grows luxuriantly and produces enormously, but it requires a heavy rainfall or free irrigation; it cannot stand a drought; its cultivation is expensive, its fodder watery, cattle starve on it and it spoils their milk. I do not think that any further experiments should be made with it.

28. The advantage of subsoiling for fodder crops is illustrated by the figures given at paragraph 20, page 33, of Mr. Robertson's report. At paragraph 21 on the same page Mr. Robertson refers to the ever-growing necessity of extending the cultivation of the fodder crops to provide for the wants of the increasing farm stock. The necessity for the extension seems to arise chiefly from keeping on the farm more stock than it wants instead of distributing the surplus to the districts for which it is designed.

29. (2) *Unirrigated Corn.*—Of the unirrigated corn crops, the chief in interest as a new product and possible source of agricultural wealth is the Minnesota amber sugar-cane, but the value of this plant as a sugar producer has not yet been established. If marketable sugar can be made from it, it will be a formidable rival to the ordinary cane, for it requires little or no irrigation, occupies the ground less than half the time that ordinary cane does, can be grown under the same conditions as common cholum, and yields 5 to 6½ per cent. of jaggery to stripped cane, or about half the yield of sugar-cane grown at a far higher cost.

30. Mr. Robertson's experiments in thick and thin sowing go to show that *thin* sowing is favorable to the outturn of grain, and *thick* to the outturn of straw. The experiments made with *hill* and *ridge* sowings were for maize distinctly in favor of the former in both grain and straw. Mr. Robertson's experiments regarding the best way of preserving the vitality of seed go to show that it is best left alone.

31. (3) *Irrigated Cereals.*—The irrigated crops consisted of various kinds of paddy. The average outturn per acre was 814 lb. of grain or at 2¼ lb. to the measure, say, 362 Madras measures, and 2,729 lb. of straw. The outturn in grain was decidedly poor. Mr. Robertson quotes the outturn of one field, 28 C., as "remarkable;" it was 2,000 lb., or, say, 900 Madras measures of grain, and 3,956 lb. of straw. The outturn in grain was higher than the average taken for settlement purposes throughout the presidency, but is one-fourth less than the 1,200 measures which represent the highest settlement grain value taken for an acre of wet land, and this again is considerably under the actual produce of many individual fields as tested by experiment.

32. Experiments made with indigenous samba paddy and mixed Madagascar—pure seems ungetable now in Madras—were decidedly in favor of the former, the average of three plots in each case giving 2,049 lb. of grain and 9,686 lb. of straw for samba, against 1,633 lb. of grain and 7,105 lb. of straw for Madagascar.

33. (4) *Industrial Crops.*—The industrial crops grown during the year were cotton, indigo, castors, arrowroot, plantains (Manilla hemp) and chillies. The average outturn of cotton was low—about 223 lb., equal to 75 lb. of clean lint to the acre—the variety was chiefly Orleans. An experiment with cotton showed that on certain of the farm soils irrigation gave a total outturn of 548·14 lb. an acre against 414·69 lb. without irrigation. The irrigated cotton when ginned gave 154·76 lb. of clean lint and 353·71 lb. of seed against 130·17 lb. of lint and 285·09 lb. of seed given by the unirrigated. The result in favor of irrigation on these particular soils was therefore 24·19 lb. of lint and 68·62 lb. of seed, or 18 per cent. more lint and 24 per cent. more seed.

34. The irrigated cotton was watered fourteen times; a single watering costs about a rupee an acre. The cost of irrigation was therefore Rs. 14. The clean lint sold at Rs. 120 a candy of 500 lb., or nearly 4 annas a pound. The value of the excess lint—24·19 lb. per acre—due to irrigation was therefore about Rs. 6, and the value of the excess seed per acre at, say, 6 annas a maund of 25 lb., about Re. 1. The total value of the excess outturn due to irrigation was therefore Rs. 7, or just half what it cost to get it. Financially, therefore, the experiment was a failure. It must be remembered, however, that though it would not pay on the farm to irrigate cotton at this rate, it might well pay the ryot growing cotton on land suited for irrigation, for he would employ no labor other than that of himself, family and the farm servants he would keep in any circumstances, and would have no labor to pay for.

35. The *Yca* valley cotton maintained its reputation as the best that has ever been tried at Saidápet. It was not as in former years attacked by borer, and it seems desirable to extend its cultivation to other parts of the presidency. It is a perennial plant, however, and Mr. Robertson at paragraph 36, page 44, of his report expresses the opinion that annual cotton pays better than perennial, because from the "open shade of the cotton plant the growth of weeds is encourged, and from its branching habit of growth, weeding cannot be done by cattle labor and is therefore expensive."

36. *Nankin* or khaki cotton has long been known in this presidency, but it is not a favorite, as it is a poor producer of lint. So far as the experience of the farm goes, it shows no special tendency to hybridise with other varieties.

37. Manilla hemp (*Musa textilis*) has become thoroughly acclimatized, and grows tall and thick of stem; 95 cuttings were distributed during the year, 50 being sent to the Central Provinces and the rest to various parts of this presidency. There are at the farm no proper appliances for extracting and preparing the fibre, and the result of trials in this behalf failed financially, the cost of extraction being greater that the value of the fibre. With proper machinery and appliances, the result of experiments would doubtless be different.

38. The value of casuarinas in the improvement and reclamation of poor and sterile soils has been long known, and the knowledge has been utilized at the farm, where a considerable area has been already planted with them. Similarly the cocoanut tree has been utilized with good results in the reclamation of salt-impregnated lands where nothing else would thrive, and now attention is being given to the culture of the salt bush (*Atriplex nummularia*), which has been recently brought to notice by the Government of India. The varieties of eucalyptus grown at the farm—they were imported, I believe, from Queensland—seem to be thoroughly adapted to the climate of Southern India, and seed of the same varieties might well now be distributed to districts.

39. Mr. Robertson's remarks at paragraph 60, page 52, and at paragraph 82, page 69, on the feasibility of making duty-free salt available for agricultural purposes are not in accord with the general official opinion on the subject. There can be no doubt that the difficulty is not so easy of solution as Mr. Robertson seems to think it, and it is quite certain that it has not been solved yet.

40. At paragraph 61, page 52, Mr. Robertson points to the value of green manure as a conservator of nitrogen in the soil: the ordinary practice of the ryot in this respect, therefore, founded on the experience of ages, is in strict accordance with the teaching of science. On page 54 are given the results of experiments made to test the value of manuring and the influence of different kinds of manure on the same

kind of soil. So far as the experiments go, they show what is self-evident in the case of a long-cropped soil that what is taken out of it must be replaced, and that like a machine or an animal, the soil can continue to work, that is, to produce crops, only so long as it is properly fed, and that it works best when fed best. The experiments so far further show that for the soils experimented on, the best manure is farm-yard, the next best oil-cake, the third ashes, and the worst slacked lime. The effect, so far as observed, of these manures, is as follows :—

Farm-yard has an immediate effect on increasing the yield of grain and straw, the effect being continued in the straw in the second year.

Oil-cake has an immediate effect in increasing the yield of grain, the effect being continued in the second year, in which also the yield in straw is increased.

Ashes show their effect in the second and third years both in grain and straw.

Slacked lime acts chiefly in the second year.

As a top-dressing, 200 lb. of saltpetre to the acre gave better results than 2,000 lb. of the sulphate of lime in the yield of both grain and straw.

41. *Live Stock.*—There were 111 cattle and 92 sheep at the beginning of the year. Of the cattle three, and of the sheep twelve, died during the year. The cattle comprised Nellores, Mysores, Adens and a half-bred Irish (Kerry) cow. One of the Aden cows died from anthrax—a disease that fortunately made no further progress among the stock. The Aden herd comprises seven bulls and seven bull-calves. It seems unnecessary to keep so many bulls at the farm when they might be much better employed in the districts for the service of the inferior country cows, and steps will be taken for the distribution of all surplus stock, both bulls and rams.

42. The steady improvement in the breeding of sheep is noteworthy, and Mr. Robertson thinks that the Saidápet breed has now reached a point when it could be profitably crossed with the merino sheep of Queensland. The fleece of the breed as it stands is bulky, but light.

In the matter of feed it is worthy of note, paragraph 84, page 69, that dholl husks given to milch cows increase materially their yield of milk.

43. In their Order, No. 388, dated 19th March 1883, Government directed experiments to be made in cheese-making. The Government of India had brought to notice the value of the "puneria" berry or *Withania coagulans*, a vegetable rennet used universally in Scinde, Affghanistan and Beloochistan for the manufacture of cheese. *Withania coagulans* is not found in this presidency, but *Withania somnifera*, a plant of the same natural order, is found all over it. Seeds of *Withania coagulans* were not procurable at the time of year from Upper India, but experiments were made with the berries of *Withania somnijera* and with various other coagulants. The result was very decidedly in favor of a different but equally common shrub, the *Epocarpurus orientalis*, known in Tamil, Mr. Robertson says, as *Prayam*; its Telugu name is *Barinki*, the Tamil synonym for which is *prashan chedi* (பிராசன்செடி). This produced rapid coagulation and a very firm curd from which a crude cheese was made. The cheese was not marketable, and special means, refrigerative or antiseptic, would have to be adopted in a climate like this to preserve cheese through the ripening process. The experiment may be interesting as a curiosity, but for this climate and among a people who are not consumers of cheese it can have no practical value.

44. *Implements and Tools.*—A considerable number of ploughs of kinds and other implements or parts of implements were sold (paragraph 88, page 70, of Mr. Robertson's report), and a consignment of 250 Swedish ploughs was also received during the year; 183 of these were sent for experimental and educational purposes to districts, one being supplied to each taluk. From the reports that have been received from Collectors, it does not seem likely that this plough will ever come into general use in the presidency. The objections taken to it are not captious; on the contrary, the ryots everywhere acknowledge its excellence as an implement, but they say that it is too dear for their pockets, too heavy for their cattle, and cannot be repaired by local labor. The price of the plough landed at Madras is Rs. 18, and its weight 94 lb. Demands for these ploughs come chiefly from Bellary, Kurnool and Salem, where the cattle are larger than in the other districts of the presidency. The Agricultural Reporter has suggested that the draught difficulty might be overcome by using several pairs of

oxen, and as the plough does the work of three country ones, any ryot with sufficient stock could easily get over it. Another but not serious objection taken to it is that it is double-stilted and that a man cannot hold the plough and drive his bullocks at the same time. This is a difficulty which a little practice always overcomes. The failures experienced by district officers in their trials of the plough arose chiefly from the want of trained ploughmen who could show how to work it. It was not possible to supply from the farm men to every district simultaneously with the ploughs, and the inconvenience to the farm of sending away its own skilled labor led to the suggestion that both ploughmen and blacksmiths should be sent from the districts to the farm to learn, the former to plough, the latter to mend, and this is now being done, the cost being met from Village Service Funds.

45. The favourite plough so far is the improved country plough, which is not half the price of the Swedish one, is single-stilted and can be used for both wet and dry cultivation, while the Swedish plough is suited only for dry. Trials were made (paragraph 98, page 73) with three new ploughs of Ransome and Co., viz., the W. K. S., the K. W. S. and the W. S. R. A. W. Of these, the first turned a first-class furrow, but was not thought strong enough for ordinary work; the second is made entirely of iron, and is, therefore, better suited for general use than the first, but the draught (289 lb.) is very heavy owing to the want of a wheel, and the abruptness of the mould-board. The furrow turned by the third plough was good, but the draught was very heavy (392 lb.); this plough was specially designed for deep ploughing in stiff clays; the furrow it cut in the soils of the farm was not very deep, but it may succeed better in the heavy clays of Bellary, where it is to be tried under the auspices of Messrs. Massey and Co., agricultural implement makers in Madras.

46. These three ploughs of Ransome's, though all more or less defective, are, in Mr. Robertson's opinion, a "considerable advance on any English ploughs yet sent out."

The cost is not given of the new German implement of which Mr. Robertson speaks so highly at paragraph 94, page 72, of his report as combining plough sub-soiler and cultivator, but from the description given of it, it is probably quite beyond the reach of the ordinary ryot.

A novel, and to my mind a very practical, idea was communicated to me lately by Mr. Weld, the Sub-Collector of South Arcot, who said he had got it from Mr. Wooldridge, of the Forest Department, viz., that in all single-stilted ploughs intended for the Indian ryot, the mould-board should be *left-handed* instead of as now *right.* The reason is, that the ryot holds the plough with his left hand and drives his bullocks from the right side of the pole, and would naturally turn the furrow slice way from him. I communicated Mr. Weld's suggestion to Mr. Robertson, who "sees no reason why such a plough should not be constructed if it be *really* wanted," and points out that "the ordinary turn-wrest plough is worked both as a right and as a left-handed mould-board to suit the slopes of hilly districts." The matter will have further attention.

47. In connexion with this subject, Mr. Robertson's remarks in paragraphs 88 and 93 are worthy of notice. It seems clear that the Government may retire in favor of private enterprise from the active business of supplying implements of recognised utility, and that its workshops may for the future confine their operations to the manufacture of new implements that may appear worthy of trial and to giving all necessary help in adapting foreign implements to native agriculture and to modifying and improving native ones.

48. One of the most interesting experiences of the farm were the deputation of ryots that visited it, generally under the conduct of Tahsildars, from the outlying districts. These visits have been separately reported on, and some of the reports have been published.

49. *Sericulture.*—The experiments made at the farm with silk-worm eggs from the North-Western Provinces, Cashmere and China were not successful; better results would probably have been had if the seed had been received when the weather was colder.

The experiments at Rajahmundry, Yercaud and Tinnevelly were similarly unsuccessful, but very fair results were obtained by Mr. Grimes at Coimbatore.

The experiments are to be continued in the coming cold weather.

50. *Model Farms.*—For the last twelve years, Government has been insisting on the necessity of establishing model or example farms at different places in the presidency, and Mr. Robertson has been frequently desired to set aside a part of the farm at Saidápet as a model farm to be worked on commercial principles. On one pretext or another the establishment of such a farm has been hitherto deferred, but Government has now positively ordered that it be established this year, and Mr. Robertson promises that the order of Government will be carried out. From the tone in which he writes, however, at paragraph 107, page 75, it is clear that he is more than doubtful—hopeless of the success of the experiment. "If it be necessary," he writes, "that such an undertaking should be taken in hand, it is at the least very undesirable that it should be instituted under such unusual circumstances and special conditions as must be encountered at Saidápet"—an expression of opinion which in plain words means this, that leaving aside all consideration of the cost of superintendence, and taking the necessary and legitimate paid labor of the Government as the equivalent of the partly paid, partly unpaid, labor of the ryot and his family and servants, the practical application to the soils of Saidápet of the science of Europe and of the School of Agriculture would end in ruin,—in other words that the despised ryot of the east can beat the trained and scientific agriculturist of the west on his own ground. A perusal of Mr. Robertson's report will show that the results attained at the farm are, so far as the agriculture of the country is concerned, purely negative; no attempt is made to connect the one with the other. More than half of the cropped area of the farm is under fodder, but no attempt is made to show that it would be better for the ryot to grow special crops to fodder his cattle than to grow crops which supply at once food for himself and forage for his beasts. Nor again are the results of farming with the ordinary staples of the country—maize, cholum, paddy, &c.,—compared with the results obtained by the ryot, nor are they proved to be in any way better than his. It seems unnecessary to repeat at Saidápet the experiments of Rothamstead; the leading principles of agriculture hold good under all conditions, and the influence of manures and the manures best suited to different soils and crops are tolerably well known; all that is wanted in India is to apply the knowledge. The ways of the ryot are impugned as wasteful, his methods as vain. Surely it is for us, who claim to have a knowledge of better things, to give to him of that knowledge and to demonstrate to him by results that our ways, not his, are the best. If we cannot do this, then all our teaching is vain, our expenditure also is vain, and our labor lost: if we cannot do this, then the sooner we put an end to our farming operations the better. It must be useless to continue experiments if it be impossible to apply their results in practical agriculture, while experiments that take the form of introducing exotics to the notice of ryots who are said not to understand the culture of the indigenous products of their country seem somewhat out of place.

51. The expenditure of the year was Rs. 77,444, of which Rs. 24,843 were on account of the School of Agriculture and Rs. 8,809 on account of cattle-disease inspection. The crops raised on the farm realized Rs. 1,854-9-0, and Rs. 1,217-13-2 were got from live-stock.

52. *The Erode Farm.*—The Rs. 7,000 which it was proposed to spend on the establishment of this farm were reduced by Government to Rs. 3,000, and the Collector was asked to submit revised proposals. None have been received and no expenditure has been incurred. It is doubtful whether the scheme will be proceeded with at present, for I do not think it has been sufficiently examined from the expert's point of view.

53. *Proposed Farm at Chittoor.*—In a letter, dated 25th February 1883, the Collector of North Arcot submitted certain proposals for the establishment of a model farm at Chittoor, but they were not sufficiently definite to enable me to lay them before Government, and as the Collector expressed himself unable to furnish the detailed estimate of cost which Government required in the case of the Erode farm, the matter dropped.

54. *Cattle-disease Inspection.*—Mr. Mills, the newly and temporarily created Inspector of Cattle Diseases, joined his appointment on the 18th August 1882. His report is attached as an annexure to this. The department consists at present of an Inspector, a Deputy Inspector and nine probationary local Cattle-disease Inspectors,

but when complete in accordance with G.O., No. 1917, dated 12th December 1881 the number of local Inspectors will be twenty-three. Of the probationers, seven passed during the year and were posted to districts; two were dismissed for misconduct.

55. The Deputy Inspector is an itinerating officer and is always on the move. The Inspector is charged with the compilation of the cattle-disease statistics of the presidency, and is the general adviser of the Government on all veterinary matters in the districts. There were several severe outbreaks of disease during the year, and in December 1882 every district but one in the presidency was affected. The most fatal disease of all was anthrax. But there were fortunately but few cases—563 in all. The most prevalent disease was rinderpest, of which there were no less than 31,614 attacks, resulting in 18,950 deaths; it was most virulent in the Kistna District, where there were 21,486 attacks and 13,039 deaths. Sheep-pox killed 840 sheep, and epizootic aphtha seventy-seven head of cattle. The disease was most virulent in the cold weather—a circumstance accounted for, in Mr. Mills' opinion, by the sudden change from wet to dry cold weather. The disease subsided as the weather got hotter.

56. Mr. Mills calculates that in the Kistna alone, taking the cattle lost at Rs. 10 a head and the sheep at a rupee, the loss in money from this one outbreak of rinderpest was Rs. 1,30,390, while for the whole presidency the loss to the agricultural wealth of the country was equivalent to Rs. 1,96,740. Mr. Mills' returns embrace only the cases that were reported, but it is far from certain that all cases are reported. The figures now given, however, show what enormous losses are caused by diseases that have hitherto been little grappled with, and how very necessary it is that the evil should be systematically dealt with. We have attacked in now; every district will within a couple of years have a trained veterinarian at the disposal of the Collector and President. To each district is supplied a permanent advance of 100 doses of the medicines suited to the most common forms of disease and half-a-gallon of phenyle for disinfecting and dressing purposes: this supply is renewed as expended.

57. At the hospital, which was opened on the 1st June 1882, Mr. Mills gave seventy-two practical demonstrations, including thirteen operations and nineteen *post-mortem* examinations; fifty-one patients were admitted during the year, of which twenty-nine were cured, one was relieved, ten died, eight were destroyed as incurable and three remained at the end of the year. Among the deaths were a Dorking fowl, which died of cholera, and an antelope, which succumbed to a fracture.

58. Three thousand seven hundred and fifty-one doses were dispensed, the greater portion of which went to the Kistna.

59. Experiments were made with Little's soluble phenyle, Barff's boro-glyceride, chloride of sodium or common salt, and the nut of the Rudraksha tree. With phenyle and boro-glyceride, the results were definite and satisfactory. Phenyle is a disinfectant, deodorizer and antiseptic, and being also non-corrosive and cheaper than carbolic acid seems likely to supersede that drug in surgery and medicine.

The experiments with boro-glyceride are extremely interesting; it is a powerful antiseptic and is perfectly harmless. Its value as an antiseptic is shown by Mr. Mills' experiment with a mutton chop, which, treated with it, was, after twenty-one days, found perfectly fresh and was cooked and eaten.

60. Salt was experimented with during the outbreak in the Kistna in order to test its efficacy as aprophylactic and a remedy. The results so far are satisfactory, but the experiments have extended over too short a time to permit of definite conclusions being drawn from them. They are being continued. The value of salt in the diet of cattle has received considerable attention of late, and a paper on the subject communicated by Mr. Mills is recorded in Board's Proceedings, No. 1178, dated 26th April 1883.

61. Mr. Mills has apparently no personal experience of the efficacy of the Rudraksha nut as a medicinal agent in cattle disease, and before sending out 300 doses of it to "districts to test its efficacy," he should have experimented with it at Saidápet. In addition to his other duties and for the practical instruction of his students, Mr. Mills has voluntarily undertaken the inspection of the various slaughter-houses

within the municipality of Madras. The results of these inspections have been submitted to Government as received ; seventeen were made during the year, and I think it cannot be doubted but that they have been useful.

62. *VI.—Collection of Statistics, including Traffic Registration.*—The agricultural statistics of the presidency and its traffic returns are compiled in the office of the Board of Revenue.

63. Being of opinion that it would be for the benefit of the public generally and of the mercantile community in particular, to publish monthly returns of the sowings of all the principal products of the country, I some time ago asked Collectors to tell me whether they could undertake to furnish me with the required information tabulated in a form which I enclose for the information of Government, and in what time after the month to which they related. The replies, so far as received, are generally to the effect that the information can be given within the end of the following month, but the Collectors of Malabar and Canara say that the peculiar conditions of the revenue systems of those districts preclude the possibility of sending any *monthly* returns that can be accepted as correct. Some Collectors, while admitting the possibility of furnishing the return, think that it will impose considerable additional labor on the already over-tasked taluk establishments. It does not seem to me that it will.

I have the honor to be,

Sir,

Your most obedient servant,

W. WILSON,

Director of Revenue Settlement and Agriculture.

THE ANNUAL REPORT

OF THE

AGRICULTURAL REPORTER TO THE GOVERNMENT OF MADRAS, 1882-83.

PART I.

SCHOOL OF AGRICULTURE.

A separate report having been submitted through the Educational Department, on the working of this institution in the past year, it is necessary only to refer to a few points of interest. At the beginning of the year there were forty-one students on the roll of the College and at the close of the year sixty-nine. The concessions recently granted, under which a student may be sent to the College, from each Collectorate of the Presidency, have been very fully availed of, eighteen of the districts having sent students. There has been a considerable increase in the number of students sent by different States and Zemindaries; the total number being now twenty-three, as follows :—

By the Mysore State ...	8
„ Patiala „ ...	1
„ Gondal „ ...	1
„ Dewas „ ...	1
„ Jaunpur „ ...	2
„ Kattywar „ ...	1
„ Berar „ ...	1
„ Vizianagrum Zemindary ...	2
„ Kárvetnagar „ ...	1
„ Kálahasti „ ...	1
„ Jaghire of Yelandur ...	2
„ Coimbatore Local Fund Board ...	2
Total ...	23

2. The Muhammadan community, having petitioned Government to establish some scholarships in the College exclusively for Muhammadans, the request was granted, and six scholarships were founded, and all are filled by Muhammadan youths.

3. There was no important change in the curriculum of the institution; the work proceeded in much the same way as in previous years; but greater attention was given to practical training in all the subjects of instruction. In Agriculture, definite examination standards have been prescribed for ploughing, and examinations have been held in this, and other practical field-work. The more perfect equipment of the Chemical Laboratory, has admitted of greater attention being given to Practical Chemistry; and the establishment of the Veterinary Hospital has afforded the students the means of obtaining a practical veterinary training. The daily Agricultural and Botanical field classes, have afforded much practical instruction; while, the out-of-door classes for Surveying, Levelling, Estimating, &c., have given the students practice

in these branches of instruction. Full courses of lectures were delivered on Agriculture, Veterinary Science, Chemistry, Botany, Physical Geography, Meteorology, Mechanics, Book-keeping, Mensuration, Arithmetic, &c.

4. The charge of the Veterinary Hospital was transferred in May to the newly appointed Inspector of Cattle Diseases. The change will, it is hoped, prove advantageous alike to the new Veterinary Department and to the College.

5. The College building has not yet been completed; but sanction has been given for the immediate construction of a portion of the upper-story. More space is still required, and, it is hoped that, the whole building will be completed soon. Under present arrangements there will probably be fully 100 students in the College next Session; and, there is every likelihood that, the number will be still further increased.

6. The Chemical Laboratory, the Veterinary Hospital, and, the Library have been maintained in good order. A number of new works have been supplied to the Library, and, some additions have been made to the list of periodicals supplied to the Reading-room. The Botanical and Experimental grounds have been further improved, both in appearance and, in general usefulness. Gymnastic Classes were held regularly throughout the year; the system of training being that prescribed in Maclaren's Physical Education. Some of the students have made considerable increase in their weight; and, in their chest and forearm measurements. The health of the students has generally been good throughout the year. In the report before mentioned, full details are given showing the progress of each student in the various subjects of instruction, and the percentage of marks obtained in each subject; the question papers set, and other particulars.

7. Orders have not yet been received for the establishment of District Agricultural Classes under the District Scheme to which general sanction has been given. It is hoped that after the proposed district classes are fully at work, it will be possible to shorten somewhat the three years' course of the College.

PART II.

DISTRICT OPERATIONS.

Agricultural Tours.

No lengthened tours were made by any officer of the department during the year; but the Agricultural Reporter to Government, made several short inspection tours. In September he inspected a site at Erode which had been selected for a District Farm; the result of that inspection visit was duly reported. In December he inspected the extensive agricultural operations in Bellary, conducted by Messrs. Sabapathy Mudaliar and Co., the report on that visit was also duly submitted. In the same month he visited Tanjore, to see the agricultural improvements instituted and being conducted by M.R.Ry. C. Krishnasawmy Mudaliar on his extensive estates near Shiyáli; a report on that inspection visit was submitted in March. In January he inspected the Remount Depôt Farm at Hosúr and has submitted his report on that visit also. He was unable to make any other tours, as, the Agricultural Exhibition demanded so much time, and attention.

Agricultural Exhibitions.

2. A large central Agricultural Exhibition was held in the City of Madras in February. It attracted exhibits from all parts of the Presidency and, created much interest. It is generally considered to have been a success. Nothing has been done to develop the scheme of Agricultural Exhibitions which received the general approval of Government (*vide* G.O., No. 257, dated the 3rd March 1882). To effect the most good, Agricultural Exhibitions must be held with greater frequency than has been the case in later years.

The Annual Ploughing Matches.

3. It had been intended to hold the Annual Ploughing Competitions during the time the Agricultural Exhibition was open and in the vicinity of the Exhibition, but it was not possible to carry out this intention, for the drought which had prevailed for a long time previous to the opening of the Exhibition, rendered all land in its vicinity quite unfitted for ploughing, and no arable land in a workable state was available within a reasonable distance.

Further Experiments in Bellary with the Beheea Sugar-cane Mill.

4. In the last Annual Report (District Operations) the result of an experiment made in Bellary with one of Messrs. Thomson Mylne and Co. Sugar-cane Mills was fully recorded. The ryots generally approved of the mill, but considered that it was not sufficiently large and powerful for their requirements. Accordingly steps were taken to obtain for trial one of the larger mills made by Messrs. Thomson and Mylne. It reached Madras in December 1882 and, was then sent on to the Bellary District. The mill was fitted with three rollers each 7 inches in length and 8 inches in diameter and cost in Calcutta Rs. 162-7-0. Mr. Young, Mechanical Instructor in the School of Agriculture, was sent to Bellary to assist under the general charge of S. Russell, Esq., Head Assistant Collector of Bellary, in carrying out the experiments. The experiments began at Virupapur in the Hospet Taluk, on the 7th of February, the general results are recorded in the next statement.

—	No. 1, 7th February 1883.		No. 2, 8th February 1883.		No. 3, 9th February 1883.			No. 4, 10th February 1883.	
	Improved Three-Roller Mill.	Ordinary Mill.	Improved Three-Roller Mill.	Ordinary Mill.	Improved Three-Roller Mill.	Ordinary Mill No. 1, Middling.	Ordinary Mill No. 2, Large.	Improved Three-Roller Mill.	Ordinary Mill No. 2, Large.
Cost of the Mill on the spot ..	Rs. 175	Rs. 80	Rs. 175	Rs. 80	Rs. 175	Rs. 80	..	Rs. 175	Rs. 80 to 100
Weight of the Mill	About 300 lb.	3,000 lb.	300 lb.	3,000 lb.	300 lb.	3,000 lb.	..	..	3,000 lb.
Time crushing occupied	167 minutes.	160 minutes.	4 hours 4 minutes.	5 hours.	4 hours 10 minutes.	4 hours 40 minutes.	3 hours 20 minutes.	3 hours.	3 hours.
Bullocks employed, and their hire per day.	2 at 4 annas each.	4 at 4 annas each.	2 at 4 annas each.	4 at 4 annas each.	2 at 4 annas each.	4 at 4 annas each.	4 at 4 annas each.	2 at 4 annas each.	4 at 4 annas each.
Laborers employed, and their wages per day.	3 at 3 annas per day.	3 at 3 annas per day.	3 at 3 annas per day.	3 at 3 annas per day.	3 at 3 annas per day.	3 at 3 annas per day.	3 at 3 annas per day.	3 at 3 annas per day.	3 at 3 annas per day.
Cost per day for manual and bullock labor.	Rs. 1-1-0	Rs. 1-9-0	Rs. 1-1-0	Rs. 1-9-0	Rs. 1-1-0	Rs. 1-9-0	Rs. 1-9-0	Rs. 1-1-0	Rs. 1-9-0
Weight of the canes when stripped and topped.	1,000 lb.	1,000 lb.	1,800 lb.	1,800 lb.	1,800 lb.	1,800 lb.	1,800 lb.	1,800 lb.	1,800 lb.
Weight of canes crushed in a day of eight hours.	2,874 lb.	3,000 lb.	3,541 lb.	2,880 lb.	3,456 lb.	3,086 lb.	4,320 lb.	4,800 lb.	4,800 lb.
Cost of crushing one ton of cane ..	Rs. 0-13-3.	Rs. 1-2-8	Rs. 0-10-9	Rs. 1-3-5	Rs. 0-11-0	Rs. 1-2-1	Rs. 0-13-0	Rs. 0-7-11	Rs. 0-11-8
Average length and diameter of the topped canes.	Length 27 inches and diameter 1 inch.	Length 27 inches and diameter 1 inch.	Length 27 inches and diameter $1\frac{1}{4}$ inches.	Length 27 inches and diameter $1\frac{1}{4}$ inches.	Length 27 inches and diameter $1\frac{1}{4}$ inches.	Length 27 inches and diameter $1\frac{1}{4}$ inches.	Length 27 inches and diameter $1\frac{3}{8}$ inches.	Length 27 inches and diameter $1\frac{1}{4}$ inches.	Length 27 inches and diameter $1\frac{1}{4}$ inches.
Weight of juice	$683\frac{1}{2}$ lb.	602 lb.	1,213 lb.	1,063 lb.	1,211 lb.	1,083 lb.	1,206 lb.	1,224 lb.	1,066 lb.
Volume of juice	$327\frac{1}{2}$ quarts.	284 quarts.	589	516	$587\frac{1}{2}$	528	539	594	$517\frac{1}{2}$
Weight of jaggery	122	116	234	207	235	211	197	212	200
Jaggery, formed per centage of cane.	12·2	11·6	13	11·5	13·0	11·7	10·9	11·7	11·1
	The pinch screws were tight in the improved Mill and the rollers did not fit properly, consequently part of the canes had to be passed through the rollers a second time.		It was not necessary to pass the canes a second time through the improved Mill to-day.		Some delay in working the improved Mill was occasioned to-day by allowing different men to learn to feed it so as to accustom them to work.				

These results are very encouraging, and were deemed perfectly satisfactory by the ryots, in whose interests the experiments were made; one of whom purchased the mill for his own use. Writing while the experiments were proceeding, the Head Assistant Collector wrote as follows :—

"On the result of the experiments up to date the following applications have been put in for Mills of the new description with three rollers :—

"Dhanapuram Bheemasama Rao	2
"Bachu Bheema Rao	1
"Mundrigi Basappah	1
"Ramasagaram Venkanna	1
"Mavinahully Karnam Hanumantappa	1
"Pinavelu Mudaliar	2
"Desai Kondappah	2
"Agali Basappah	1
"Muddalahur Balappa	1

"In all twelve applications have been received within the past two days. The applicants are anxious to have the mills supplied to them as soon as possible."

Unfortunately Messrs. Thomson and Mylne's supply of these mills was at the time exhausted, and they were unable to arrange to supply any. It is believed that the local Agents of the firm—Messrs. Oakes and Co., have made efficient arrangements for securing a supply of these mills before the next cane-crushing season begins.

Distribution of Ploughs in the Districts.

5. A consignment of 250 Swedish ploughs from the Secretary of State, reached Madras in November; steps were immediately taken for the distribution of specimens over the Presidency—one in each taluk, as had been decided should be done; the total number distributed was 183, as shown below :—

To the Collector of—

Coimbatore	10	South Canara	5
Salem	10	Kurnool	8
Bellary	8	Tanjore	9
Cuddapah	13	Chingleput	8
Malabar	8	Nilgiris	3
North Arcot	16	Ganjam	10
South Arcot	8	Anantapur	7
Tinnevelly	9	Kistna	11
Godávari	10	Trichinopoly	5
Madura	6		
Vizagapatam	10	Total ...	183
Nellore	9		

The expenses of packing and delivery, were borne by the Saidápet Farm. The ploughs are excellent, in construction, and, in material; but, they are double stilted instead of single, which, were specially applied for as being simpler in construction and less expensive. The cost of the ploughs about Rs. 18 each delivered here, is however, very moderate. The ploughs having been distributed so near to the close of the official year, there is but little to report regarding the experiments made with them; full reports it is hoped, will be available for record in the next Annual Report. But, judging by the demand that has sprung up for the plough in Bellary, Kurnool, Salem, and other districts, where the cattle are generally good, and black soils prevail, the plough has already met with much appreciation. For the Southern Districts the plough will be found, it is to be feared too heavy for a pair of the small wretched cattle generally used; but, the inferiority of the cattle, is not a fatal objection to the introduction of the plough into the Southern Districts, as some people imagine for, there is no reason why two pairs, or even three pairs of cattle should not be attached to the plough when at work. It is usual in Cuddapah, Bellary, Kurnool and, other districts, to employ several pairs of cattle in dragging the large plough used there for deep tillage. The newly-imported Swedish plough is, of course, unfitted for working in the puddled soil of paddy land, but is admirably suited for giving the first furrow

to paddy land, before the application of irrigation water. The mould-board is set very wide in order that the plough may turn over as much soil as possible in a day but, of course, this makes the plough of greater draught. By setting the mould-board closer to the beam, the draught can be considerably lessened though less work will be done in a day. The actual volume of soil turned over by the Swedish plough in an ordinary day, is at least three times the volume stirred by a country plough in the same time; while, the quality of the work of the Swedish plough is incomparably superior. If the plough is likely to become established, as seems now probable in Bellary, Kurnool, and in one or two other districts, it is desirable that the local blacksmiths should be taught not only to repair, but to make, such ploughs. A number of ryots belonging to Sirvél Taluk in the Kurnool District, who had purchased a number of the ploughs, took steps to induce a Saidápet blacksmith to go and settle amongst them; their proposals however fell through, and, arrangements were eventually made through the Collector of the district for the deputation of a skilled blacksmith to the district, for a few months' employment, his pay and expenses to be debited to the Village Service Fund. In some other districts, there is a desire to follow the example thus set; but instead of it being followed it is much to be preferred that some intelligent village blacksmiths should be sent to Saidápet for the necessary training.

District Ploughing Trials.

6. No ploughing parties, such as were employed in previous years, were sent into the districts; but instead, Farm ploughmen have been sent, usually two together, and placed for a time under the orders of the Revenue officers interested in plough trials. Ploughmen have thus been sent to the Kistna, Salem, Cuddapah, and North Arcot Districts, the results of their employment will be recorded in the next Annual Report.

A Fungoid attack on Tobacco.

7. The following interesting communication was received from Messrs. Arbuthnot and Co. of Madras. It is recorded here in the hope that attention may be directed to the matter and further data collected when possibly some useful conclusions may be formed:—

From Messrs. ARBUTHNOT and CO., to W. R. ROBERTSON, Esq., M.R.A.C., Superintendent, Government Farms, dated Madras, 26th February 1883.

We venture to trouble you with the enclosed copy of a letter from Messrs. Hall, Wilson, and Co. of Cocanada to our address on the subject of the ravages of the vegetable parasite called bodu, in some of the Godávari lunkas, of which we are with them the joint renters. The parcel of specimens referred to is sent herewith, and we shall be extremely obliged if you will favor us with such remarks as the subject may, in your opinion, seem to require. We feel sure that they will not fail to be of interest even if you should not be able to suggest a remedy for the evil which is likely to be very prejudicial to the extension of tobacco cultivation in soils apparently well adapted for it.

P.S.—The accompanying parcel has not been opened by us, but is sent on to you just as received by us.

From Messrs. HALL, WILSON, and CO., to Messrs. ARBUTHNOT and CO., Madras, dated Cocanada, 19th February 1883.

Godávari Lunkas.

During the writer's tour of inspection of the lunkas regarding which we are writing you separately, Mr. MacNab's attention was everywhere most forcibly attracted to a vegetable parasite called in Telugu "*Bodu*" which attacks the roots of the tobacco plants with most injurious and, in many cases, absolutely fatal effect, and in the hope of finding some remedy for this, we are sending you by the S.S. *Himalaya* (leaving to-morrow) a packet containing specimens of the bodu of tobacco attacked by it and of the soil from which the specimen plants were taken, and we shall be greatly obliged if you will have them submitted to an expert for analysis and report. One striking instance which came under Mr. MacNab's notice was that of a 10-acre field of tobacco on Siddhantam lunka, which should have yielded 10 candies of tobacco, valued at Rs. 1,000, but which had become so overrun with bodu, that the tobacco had to be cut when half grown, and it was expected to realize only half value: the estimated value on this field being thus

Rs. 750. Of course, such a loss by the ryots would in most cases mean a serious loss of revenue to us, and such being the case we have confidence in asking the favor of your assistance in the matter.

We are not aware if bodu is known to botany; we are told that it is peculiar to the lunkas and we certainly cannot remember, nor could Bashyakarlu, to have seen it elsewhere. Mr. MacNab while on the lunkas did his utmost to collect information regarding the bodu, and especially as to what causes it to show on one field and not on another, but the pest appears to be everywhere accepted by the ryots as inevitable and unavoidable, and the opinions expressed regarding it were so conflicting and, under inquiry in individual cases, so vacillating as to be wholly unreliable. Naturally the first reason for it put forward was poverty of soil (that being a good basis for a claim for remission of kist), and secondly, too much moisture in the soil from the heavy rains of November last. One of the most intelligent ryots questioned upon the subject, Chetti Brahmanah, the renter of Ankampalem lunka, while giving his adhesion to the poor soil theory, declared that bodu always shows in land kept under tobacco for more than three consecutive years, but as he further stated that he had himself been cultivating tobacco on Ankampalem for fifty years, we do not attach much importance to his theory although he tried to justify it by saying that every fourth or fifth year he left the land under grass to recuperate.

As against the poor soil and excessive moisture theories, bodu is to be found attacking particular plants, among others wholly free from it and in every way healthy, and the most striking instance (that above referred to in Siddhantam) observed was in a field of comparatively high land round which on a much lower level (almost in the bed of the river in fact) and divided from the field in question merely by a small bund, the tobacco was particularly luxuriant and free from bodu. On the whole we incline to the belief that bodu is in the nature of a disease of the plant itself although doubtless aggravated by poverty of soil. As said above, however, it is stated to be peculiar to the lunkas, and it is noteworthy also that it is not wholly confined to tobacco, as it was found at one place in a field of brinjals on Abrayapuram lunka.

The specimens we are sending you may serve to identify the plant, but as it will necessarily be somewhat withered when it reaches you, and as it may besides be something presently unknown to botany, we may mention that at actual growth, bodu is a yellow-stemmed succulent asparagus-like shoot growing to a height of 6 at 9 inches above the ground and covered for 3 to 4 inches from the top with a tiny bell-shaped flower, yellow, pink or pale-blue in color, in each of which is usually to be found a small yellowish worm or caterpillar. The bodu springs from the root of the tobacco plant, sometimes in clusters of five or six stalks, always grows quite perpendicularly, and can be removed by the most gentle pull breaking clean at the juncture with the tobacco root. The ryots say that the healthy tobacco plant has a compact stumpy lap root sinking nearly straight downwards, whereas a sickly plant throws out a number of delicate hairlike feelers, and it is to these that the bodu usually attaches itself after at a distance of 9 inches or a foot from the stem of the tobacco plant. Opinions differ greatly as to the effect of removing the bodu, but the general idea is that the lesion of the root caused by the removal of the parasite (if we are right in calling it such) is fatal to the plant, but our observation leads us to believe that this is only so in extreme cases, as on Kakaraparu and Narkandenelly the ryots always remove the bodu, and carry it away from the fields to their villages where the cattle eat it. This is in striking contradiction to what was told us on all the other lunkas, viz., that the stuff would not be touched by any animal; and we are giving the widest possible publicity to the fact, which is a most important one on this respect, that as the bodu dies when plucked up and thrown on the ground, the worms or caterpillars, with which it is simply alive, being deprived of their natural food, attack the tobacco leaf, and any use which could be found for the bodu and which would ensure its removal from the field would be of the greatest advantage. Analysis may indicate some still better use for the stuff, and this is a point to which we would like attention given.

The remedy which, of course, most naturally suggests itself for a blemish which clearly preys upon weakly plants is only a manuring, but it would be quite hopeless we fear to expect the ryots to manure their fields, which already receive nourishment from yearly alluvial deposits, but we think they might be induced to manure their nurseries more heavily and thereby ensure a stronger seedling to start with. We shall be glad to have a professional opinion on this point, and also as to what description of manure would be best if the sample of the soil which we send you gives any indication of what component is wanting.

From W. R. ROBERTSON, Esq., M.R.A.C., Agricultural Reporter to the Government of Madras, to Messrs. ARBUTHNOT AND CO., Madras, dated Saidápet, 23rd March 1883, No. 480.

I regret to have to inform you that Dr. Wilkins to whom I sent the case and specimens from Cocanada, has reported that owing to the decomposed state in which the specimens reached him, he has been quite unable to identify the parasite and can afford no information regarding its life-history. I regret, therefore, we cannot be of use to your correspondents as regards the botanical aspects of the question.

My own opinion is that the best means of preventing their parasitical attack will be to avoid cropping with tobacco for a couple of years, the land on which tobacco is most severely attacked, and also, to avoid land liable to become water-lodged.

The parasite probably feeds only on plants of the same Order as the tobacco plant; hence if the land is cropped with a crop belonging to another Natural Order, the parasite may not find congenial conditions and may die out. Some good may result by obtaining fresh tobacco seed from a locality where the parasite is unknown; and some advantage will be gained from collecting and burning the parasite. But, I am of the opinion that the most satisfactory results will be obtained by abandoning for tobacco cultivation, for a couple of years or more, the land on which the plants are most infested by the parasite. As a rule parasites that feed on plants of a certain Order increase rapidly when the land is long cropped only with plants of that Order.

I do not think that chemical analysis of the soil would throw any light on the question. There can be no doubt but that strong healthy plants are better fitted to resist the attacks of the parasite than sickly ones, and, therefore, high manuring must lead to good results.

As a general rule plants that grow very rapidly are very liable to attacks of vegetable parasites, probably because the growth is not healthy, the energies of the plant being over-stimulated in one direction. This is the case always, when the organic matter of the soil is very abundant and out of proportion to the available mineral food of the soil. The alluvial soils of the lunka are very likely to be in this condition and if so, it might be advantageous to dress them with caustic lime, or even to burn a portion of the surface soil; these means will reduce the excess of organic matter and tend to restore the desirable balance between the organic and mineral constituents of the soil.

SEED DISTRIBUTION AND DISTRICT EXPERIMENTS.

8. The following statement shows the seed distributed for experimental cultivation during the year; it was, in most instances, supplied and delivered free of charge:—

	Pounds.
Maize (Yea mays)	1,685
Chinese Sugarcane (*S. Saccharatum*)	972
Cotton Seed, New Orleans	290
Castor beans	73
Reana Luxurians	73
Tobacco seed	13
Miscellaneous seeds	43
Do. tree seeds	49
Do. plants	97

9. It is necessary to observe that great care is taken to ensure that only good seed is issued from the farm. Seeds stored in the farm granary have their vitality tested frequently, and any sample found to contain a low percentage of vital seed is condemned, and used for feeding or as manure. The results of these tests have not always been recorded, but the following will suffice to show the general quality of the seed:—

Names of Grains.	30th May 1882.	24th June 1882.	7th August 1882.	22nd September 1882.	28th April 1883.	2nd May 1883.	6th June 1883.	10th July 1883.
	Harvest of 1882.				Harvest of 1883.			
Hawkesbury Maize ..	80	..	74	..	96	..	86 }	84
Clarence do. ..	56	..	60	..	93	..	83 }	
Amber Sugarcane ..	55	..	*80	*80	92	..	75	65
Planters' Friend	89	..	77	79	95	..	50	50
Sorghum Saccharatum ..	29	..	*50	..	91	..	81	49
Castor Beans	95	95	..	..	90	..	..	..
New Orleans Cotton Seed ..	40	37	*50	..	..	78	75	*76
Madagascar Paddy ..	80	..	70	70	..	91	90	82
Reana Luxurians	87	..	40	..	..	..	90	90
Broom Millet	..	..	60	..	96	..	70	70

* By winnowing out the inferior seed the percentage of vitality of the sample was increased.

10. As a rule, seed of each kind is stored in one bulk, and from this all issues are made, hence the quality of seed of any kind is very uniform. The seed in store is frequently winnowed, to separate weevils and other insects, which may have got amongst it. It will be noticed in the following extracts from reports, that the quality of the seed is frequently blamed for the non-success of experiments, regardless of the fact that the same seed in other taluks even of the same district yielded fair results. One note, referring to a maize experiment records the fact that the seed was sown six inches deep; if sown so deeply, it is not surprising that it failed to germinate; from 2 to $2\frac{1}{2}$ inches would have been the proper depth. As regards the injury done to the seed by weevils it is almost impossible to prevent them getting amongst seed during its transit by road, rail, or steamer; but all seed on its arrival at its destination should at once be unpacked and exposed fully to the heat of the sun and be winnowed before being repacked; if the seed is left in the packing cases as there is reason to fear it too frequently is, for weeks, even months, weevils will most certainly destroy it.

11. The following statements show the general results of the district experiments.

Number.	General nature of Soil.	Area of Land sown.	Kind and Quantity of Manure used.	Pounds of Seed sown.	Date of Sowing.	Percentage of Vital grain in the Seed sown.	Number of times irrigated.
							MAIZE.
	NORTH ARCOT DISTRICT.	ACRES.		LB.			
1	Mixture of clay and sand.	·06	1 cart-load of cow-dung and ashes.	·93	2nd September 1882.	Not known.	40 times ..
2	Do. do. ..	·06	1 cart-load of cow-dung and ashes.	1·25	10th December ,,	Do.	Do. ..
3	Do. do. ..	·06	1 cart-load of cow-dung and ashes.	1·25	25th September ,,	Do.	....
4	Do. do. ..	·15	15 cart-loads of cattle-dung.	12·50	11th November ,,	Do.	5 or 6 times ..
5	Garden	1·00	50 cart-loads of cattle manure.	16·00	September ,,	60	Nearly 20 times.
6	A mixture of loose gravel and clay.	·06	About 4 cart-loads of sheep-dung and about 5 cart-loads of horse-dung.	9·00	14th October ,,	90	Once in 3 days.
7	Sandy soil	·66	10 cart-loads of cattle-dung.	11·50	3rd July ,,	80	5 times ..
8	Black soil	·02	⅛ cart-load of cattle manure.	·20	28th ,, ,,	95	25 times ..
9	Iron-grey soil	·08	1 cart-load of cattle manure.	·75	24th June ,,	80	30 times ..
10	Black soil	·08	1 cart-load of cattle manure.	·32	12th September ,,	75	35 times ..
	BELLARY DISTRICT.						
1	Dry land	·22	2 cart-loads of sheep-dung.	5	28th June ,,	75	4 times a-month.
2	Do.	·25	200 baskets of dung and rotten straw. Sheep were also folded.	5	14th August ,,	75	4 times ..
3	Do.	2·00	10 cart-loads of rotted cow-dung and straw.	20	20th July ,,	90	12 times ..
4	Do.	1·00	10 cart-loads of rotted cow-dung and straw.	10	5th August ,,	90	Twice .. ..
5	Dry land under a well ..	·03	2 cart-loads of dung and straw.	·50	19th September ,,	75	8 times .. ..
6	Black soil	·03	2 cart-loads of dung and straw.	1	20th August ,,	75	Do.
7	Dry garden land.. ..	·03	½ cart-load of refuse castor-seeds.	·50	28th June ,,	75	Once in 4 days.
8	Do. do.	·12	½ cart-load of refuse castor-seeds.	1	7th July ,,	75	Once in 4 days for 15 days, and then it was not necessary.
	COIMBATORE DISTRICT.						
	Black loam	·20	4,000 lb. street sweepings.	4·50	13th May ,,	75	4 times ..
	TANJORE DISTRICT.						
1	Black soil	·03	3 cart-loads of cow-dung and sheep-dung.	1	16th September ,,	Not known.	5 times ..
2	Sandy and clay soil ..	·06	4 cart-loads of dung. ..	1	21st August ,,	Do.	4 times ..
3	Dry sandy soil	·21	5 cart-loads of cattle-dung mixed with ashes. ..	13·50	5th, 18th, 20th, 22nd and 25th Aug. and 1st, 2nd, and 3rd Sept. 1882.	Do.	20 times ..
4	Mixture of black and red soil.	·21	40 kalams of ashes and manure from 2 herds of cattle.	7	1st September 1882.	75	15 times ..
5	Do. do. ..	·08	4 cart-loads of night-soil and decayed matter.	2·25	26th ,, ,,	75	32 times ..
6	Do. do. ..	·05	5 cart-loads of night-soil and decayed matter.	3	29th ,, ,,	75	30 times ..
7	Do. do. ..	·03	2 cart-loads of night-soil and decayed matter.	1·25	20th August ,,	75	21 times ..

Number of Inches of Rainfall and Number of Wet Days recorded at nearest Station during growth of Crops.		Date when Crop harvested.	Duration of growth.	Outturn per Plot.		Outturn per Acre.		Remarks by the Reporters.
Wet days.	Inches.			Grain.	Straw.	Grain.	Straw.	
			DAYS.	LB.	LB.	LB.	LB.	
23	20·00	25th December 1882.	114	12·50	31·26	208·3	520	About 31¼ measures of grain and 7½ visses of stalk if cultivated with country cholum.
23	20·00	1st March 1883.	81	26·20	31·20	436·6	520	About 7½ measures of cholum and 7 visses of stalk can be realized from country cholum cultivated under similar circumstances.
23	20·00	13th February ,,	141	30·00	31·20	500	520	
9	10·90	28th ,, ,,	109	105·00	Bundles 30	700·0	Bundles 200	The seed was worm-eaten soon after its receipt. It was therefore impossible, it is said, to ascertain its vitality.
10	10·00	At the end of November.	About 90	400·00	Not known.	400	Not known.	Country maize under similar conditions would have produced 500 lb. of grain and nearly 2,000 lb. straw.
18	18·00	28th January 1883.	106	45·00	1,250·00	750	20,833	Rain at the time of flowering lowered the outturn. Probable average outturn from country maize is about 375 lb.
4	6·90	15th October 1882.	104	300·00	·38	454	·57	Probable average outturn from country maize is about 240 lb.
8	14·00	In the beginning of December.	126	8·10	24·00	405	1,200	The crop was very good. The probable outturn from country maize is about 375 lb. and 1,200 lb. of straw.
25	10·05	In the month of October.	99	57·60	100·00	720	1,250	The crop was pretty good. The probable outturn from country maize is about 300 lb. and 900 lb.
9	6·50	In the month of January.	111	1·00	16·00	12	200	The crop suffered from blight. The probable outturn from country maize is about 12 lb. and 218 lb.
Not known.	2·00	26th November 1882.	151	107·00	1,000·00	486	4,545	The produce was not actually weighed. Much damaged. Produce small and not marketable.
28	16·67	30th ,, ,,	108	25·00	..	100	..	The First-class Revenue Inspector personally inspected the crop and reported that the cobs were not as well filled as those of the country maize; that there was only one cob on each stem; that the crop is not suited to the soil; that, on the whole, the yield was only one-fourth that of the country maize; and that the grain was not so sweet as country maize.
30	9·75	20th October ,,	92	About 1,750	1,250·00	875	625	
24	8·75	1st November ,,	88	About 8·75	625·00	875	625	
10	5·25	30th December ,,	102	..	75·00	..	2,500	The cobs were sold without being shelled. Part of the produce was stolen. The weight of grain is not therefore known.
10	5·25	30th November ,,	102	..	80·00	..	2,666	
42	21·75	25th October ,,	119	24·00	14·20	800	473	
42	19·00	30th ,, ,,	115	87·00	78·60	725	655	
19	7·79	25th August ,,	104	285·00	2,600·00	1,425	13,000	Each stem was more than 8 feet high and the cobs were very large. There were upwards of 800 grains in each cob.
18	20·00	20th December ,,	95	50·00	80·00	1,666	2,666	
15	3·00	4th ,, ,,	105	45·00	50·00	750	833	
22	12·32	5th ,, ,,	93 to 122	285·00	450·00	1,357	2,143	There were fewer cobs in the centre of the field than in the margin.
42	Not registered.	17th ,, ,,	107	100·00	1,063·00	476	5,061	
19	16·67	5th ,, ,,	70	14·50	125·00	181	1,562	The outturn is small for want of timely and sufficient rain.
19	16·67	20th ,, ,,	82	3·70	70·00	74	1,400	
20	15·00	2nd ,, ,,	103	8·50	159·00	283	5,300	

Number.	General nature of Soil.	Area of Land sown.	Kind and Quantity of Manure used.	Pounds of Seed sown.	Date of Sowing.	Percentage of Vital grain in the Seed sown.	Number of times irrigated.
							MAIZE—
	KURNOOL DISTRICT.	ACRES.		LB.			
1	Mixed, black and red ..	·19	A flock of 400 sheep was folded for a night.	3·00	10th July 1882.	75	12 times ..
2	Red soil	·03	A cart-load of manure consisting of night-soil and street sweepings.	75·00	1st ,, ,,	75	Do. .. ..
3	Blackish red sandy soil ..	·25	Was in a good manural condition.	7·00	8th August ,,	25	Twice .. ..
4	Do. do. ..	·25	Was in a good manural condition.	7·00	5th ,, ,,	33	Do. .. ..
5	Do. do. ..	·21	400 lb. of a mixture of rotten straw and dung.	5·50	9th ,, ,,	Not known.	Do. .. ..
6	Mixed soil	·02	1,000 lb. of cattle-dung.	2·00	28th July ,,	15	20 times ..
7	Old garden land, gravelly soil.	·03	450 lb. of cattle-dung. ..	·47	20th August ,,	60	4 times ..
8	Red soil	·02	450 lb. of cattle-dung ..	·35	15th July ,,	12	8 times ..
9	Do.	·03	50 lb. of cattle-dung ..	·40	6th ,, ,,	5	6 times ..
	CUDDAPAH DISTRICT.						
1	Black soil	·20	10 cart-loads of cow-dung. Cattle were also herded on the land.	2·00	23rd September ,,	50	Once in 10 days.
2	Mixed regar (black) ..	·16	3 cart-loads of cattle dung. Cattle were also herded.	2·00	16th July ,,	50	Twice .. ..
	SOUTH ARCOT DISTRICT.						
1	Fertile	·03	26 baskets of ordure and cow-dung.	·87	1st ,, ,,	50	12 times ..
	ANANTAPUR.						
1	Dry land	·81	10 cart-loads of cow-dung and a flock of sheep picketted for two nights.	10·00	26th August ,,	Not known.	13 times ..
2	Wet land	·37	6 cart-loads of cow-dung.	5·00	1st October ,,	Do. ..	11 times ..
3	Clay mixed with sand ..	2·00	7 cart-loads of cow-dung.	20·00	16th July ,,	Do. ..	44 times ..
4	Red soil	·40	3 cart-loads of sheep-dung, eight seers of oil-cake of castor-oil seeds, two seers of chunam.	5·00	8th September ,,	Do. ..	6 times ..
	SALEM DISTRICT.						
1	Rocky—vicinity of a hill side.	·50	None	15·00	11th June ,,	95	Never irrigated.
							MADAGASCAR
	TRICHINOPOLY DISTRICT.						
1	Black loam	·50	50 kalams of cow-dung ..	50·00	18th October 1881.	10	50 times ..
2	Black soil	·20	2 cart-loads of cow-dung and twenty-five cooly-loads of Poonghum and Avaram leaves, each load weighing about 12 lb.	50·00	12th November ,,	10	32 times ..
3	Red sandy soil	·20	1 cart-load of cattle-dung.	13·00	15th September ,,	86	3 times ..
	CUDDAPAH DISTRICT.						
1	Black, somewhat clayey soil.	·05	About 180 lb. of cattle-dung mixed with ashes and 1 cart-load of Kanuga leaves.	2·95	16th January 1882.	50	Twice a day daily.
	TINNEVELLY DISTRICT.						
1	Red loam	·10	3 cart-loads of dung and ashes.	11·00	3rd September 1881.	Not known.	7 times ..
2	Black loam	·12	1 cart-load of dung and ashes, and sheep were also folded.	25·00	12th February 1882.	Do. ..	20 times ..
3	Do.	·12	Sheep manure	20·00	18th October 1881.	Do. ..	25 times ..
4	Red soil	·06	2 cart-loads of dung and ashes; sheep were also folded.	10·00	16th ,, ,,	75	25 times ..

(*Continued*).

Number of Inches of Rainfall and Number of Wet Days recorded at nearest Station during growth of Crops. — Wet days.	Inches.	Date when Crop harvested.	Duration of growth.	Outturn per Plot. — Grain.	Outturn per Plot. — Straw.	Outturn per Acre. — Grain.	Outturn per Acre. — Straw.	Remarks by the Reporters.
			DAYS.	LB.	LB.	LB.	LB.	
33	10·00	6th October 1882	88	40·00	225	210	1,184	The Collector writes that the stalks of the maize were slightly taller and thicker than those of the country maize; but in several cases no cobs were produced; and where there were cobs, they were not as well filled as those of indigenous maize ordinarily are. Again, in the case of the indigenous maize, each stalk bears two or three or sometimes even four cobs, but in no case did the Australian maize yield more than one cob.
40	11·00	6th „ „	97	10·00	50	333	1,666	
51	7·00	20th November „	104	42·00	200	168	800	
51	7·00	20th „ „	107	48·00	260	192	* 1,040	
51	7·00	20th „ „	103	..	148	..	704	
14	4·00	29th October „	93	5·00	25	250	1,250	
8	6·00	1st January 1883	134	..	40	..	1,333	
8	1·00	30th October 1882	107	..	15	..	750	
8	6·00	24th „ „	110	..	25	..	833	
4 or 5	2·00	15th February 1883	145	22·50	480	112·5	2,400	
20	10·00	12th October 1882	88	40·00	288	250	1,800	
34	13·00	1st „ „	92	..	64	..	2,133	The grain on the cobs was for the most part eaten away by squirrels when it was nearly ripe. The crop, it is said, throve very well in the compound of the Villupuram Sub-Jail. Each cob was about three-fourth foot long.
12	11·95	10th December „	106	340·00	1,093	420	1,350	
10	7·15	1st January 1883	92	66·60	203	180	550	
17	11·05	25th November 1882	132	92·00	180	46	90	
				Seers	Maunds	Seers	Maunds	
..	9·00	10th January 1883	122	82	40	205	100	
91	17·34	January „	203	206·00	..	412	..	

PADDY.

Wet days.	Inches.	Date when Crop harvested.	Duration of growth.	Plot Grain.	Plot Straw.	Acre Grain.	Acre Straw.	Remarks by the Reporters.
			DAYS.	LB.	LB.	LB.	LB.	
23	13·00	22nd March 1882	155	72·00	60	144	120	
5	1·75	31st „ „	139	107·00	110	535	550	
121	..	15th February „	153	33·00	200	165	1,000	
7	2·65	21st May „	125	29·10	24	582	480	
36	21·97	6th February „	156	29·00	59	290	590	
					Bundles		Bundles	
..	13·30	5th June „	114	125·00	7	1,042	58	
..	16·35	28th February „	133	110·00	6	917	50	
							LB.	
22	9·75	18th March „	157	25·00	45	417	750	

* Grew high, but was prostrated by rain and wind.

MADAGASCAR

Number.	General nature of Soil.	Area of Land sown.	Kind and Quantity of Manure used.	Pounds of Seed sown.	Date of Sowing.	Percentage of Vital Grain in the Seed sown.	Number of times irrigated.
	TINNEVELLY DISTRICT—(*Continued*).	ACRES.		LB.			
5	Black loam	·01	6 head-loads of ashes, dung and vegetable refuse.	6·50	24th September 1881	Not known.	50 times ..
6	Do.	·10	160 lb. sweeping and 80 lb. sheep manure.	3·20	15th November „	85	16 times ..
7	Do.	·01	1 load of dung and 1 load of Auvoori plants (Cassia auriculata).	6·50	8th September „	Not known.	50 times ..
8	Do.	·03	1 cart-load of dung ..	6·50	16th October „	Do. ..	50 times ..
9	Red loam	·06	Farm-yard manure ..	10·00	September „	75	..
	BELLARY DISTRICT.						
1	Wet land under a tank..	·01	10 baskets of dung and sweepings.	4·00	1st January 1882	50	Daily ..
2	Wet land watered by the Tungabhadra.	·05	Manured, and further strengthened by folding sheep.	5·00	10th August 1881	50	Daily till 2nd December.
3	Dry land under a well ..	·02	25 baskets of dung and sweepings. Sheep were also folded.	1·00	17th „ „	Not known.	Do. ..
4	Wet and fertile soil ..	·02	Cow-dung and straw ..	1·00	27th July „	9	Daily till harvest, except 6 days.
	COIMBATORE DISTRICT.						
1	Black loam	·20	....	23·00	24th October „	92	32 times ..
	TANJORE DISTRICT						
1	First-class wet land ..	·33	4 cart-loads of leaves and cow-dung. Sheep were also folded.	42·00	29th July „	80	9 times ..
	NORTH ARCOT DISTRICT.						
1	Clayey and sandy soil (fertile).	·49	Leaves, cow-dung and horse litter.	26·25	24th August 1882	100	Daily irrigated. Small quantity of water was used when the plants were young, and larger quantity as they matured.

PADDY—(*Continued*).

Number of Inches of Rainfall and Number of Wet Days recorded at nearest Station during growth of Crops.		Date when Crop harvested.	Duration of growth.	Outturn per Plot.		Outturn per Acre.		Remarks by the Reporters.
Wet days.	Inches.			Grain.	Straw.	Grain.	Straw.	
			DAYS.	LB.	LB.	LB.	LB.	
..	..	24th January 1882	122	26·00	120	2,600	12,000	
11	6·20	5th March ,,	110	59·00	60	590	600	
..	..	14th January ,,	128	13·00	120	1,300	12,000	
..	..	13th February ,,	120	6·50	60	217	2,000	
..	..	January ,,	About 150	67·00	..	1,111	..	
..	..	25th May ,,	144	2·50	50	250	5,000	The tank having dried 15 days previous to the maturation of the crop, the crop withered away almost entirely.
11	9·45	16th December 1881	128	176·00	..	3,520	..	
4	..	15th January 1882	141	4·00	9	200	450	
29	15·70	15th December 1881	141	11·00	20	550	1,000	The result of the crop is moderate.
17	8·70	29th March 1882	156	75·00	175	375	875	
..	..	20th January ,,	175	210·00	..	636	..	If Sembalai paddy had been cultivated, 672 lb. would have been produced.
28	21·80	20th December ,,	118	12·50	2,000	2,551	4,081	The seeds all germinated.

Number.	General nature of Soil.	Area of Land sown.	Kind and Quantity of Manure used.	Pounds of Seed sown.	Date of Sowing.	Percentage of Vital Grain in the Seed sown.	Number of times irrigated.
							NEW ORLEANS
	SALEM DISTRICT.	ACRES.		LB.			
1	Gravelly	·70	*Nil*	3·25	20th May 1880	Not known.	Not irrigated ..
	COIMBATORE DISTRICT.						
1	Red loam, third-class dry land.	·02	60 Madras measures of sheep and cattle manure.	·06	4th October 1881	50	16 times ..
	BELLARY DISTRICT.						
1	Dry black soil	·27	1 cart-load of dung and sweepings.	2·50	28th September ,,	50	Not irrigated ..
	TINNEVELLY DISTRICT.						
1	Red loam	·32	Sheep manure	4·00	18th October ,,	Not known.	..
2	Black loam	·20	320 lb. sweepings, 160 lb. sheep manure.	2·85	20th ,, ,,	75	..
3	Red loam	·10	4 cart-loads of ashes ..	3·50	2nd November ,,	Not known.	..
							REANA
	TRICHINOPOLY DISTRICT.						
1	Black sandy soil.. ..	·04	2 cart-loads of cattle-dung.	..	21st September 1881	36	5 times ..
	TINNEVELLY DISTRICT.						
1	Red loam	·11	3 cart-loads of ashes ..	1·50	19th ,, ,,	Not known.	9 times ..
2	Black loam	·16	4 cart-loads of dung ..	2·25	6th November ,,	Do.	..
	BELLARY DISTRICT.						
1	Red soil under a well ..	·05	10 baskets of sheep-dung.	2·50	8th March 1882	75	Once in 4 days..
	TANJORE DISTRICT.						
1	Dry land of mixed soil ..	·41	10 cart-loads of cattle manure.	1·00	10th July 1881	50	Not irrigated ..
							PLANTERS' FRIEND
	KURNOOL DISTRICT.						
1	Masabu or mixed, black and red.	1·00	None	2·75	10th October 1881	5 or 6	Not irrigated ..
2	....	1·00	Do.	2·75	10th ,, ,,	5 or 6	Do. ..
	TANJORE DISTRICT.						
1	Dry land of mixed soil.	·41	10 cart-loads of cattle manure.	4·00	10th July ,,	50	Not irrigated ..
	BELLARY DISTRICT.						
1	Fertile red soil	·02	Cow-dung and rotten straw.	Tolahs 30	16th ,, ,,	25	..
	TINNEVELLY DISTRICT.						
1	Black loam	·16	4 cart-loads of dung ..	2·25	6th November ,,	Not known.	..
	CUDDAPAH DISTRICT.						
1	Red loam	·75	6 cart-loads of cattle-dung.	30·00	7th December ,,	80	5 times ..
2	Mixed red soil	·67	Cattle were herded six days.	6·00	23rd ,, ,,	25	6 times ..
3	Red loam	·26	The land was in good manural condition, having been previously cultivated with turmeric.	Not reported.	25th March 1882	Not known.	4 times ..

Number of Inches of Rainfall. Wet days.	Number of Inches of Rainfall. Inches.	Date when Crop harvested.	Duration of growth.	Outturn per Plot. Cotton in Seed.	Outturn per Plot. Straw.	Outturn per Acre. Cotton in Seed.	Outturn per Acre. Straw.	Remarks by the Reporters.
COTTON.								
			DAYS.	LB.		LB.		
40	17·10	October 1880	About 130	353·00	..	505	..	
2	1·50	6th February 1882	125	·60	..	30	..	There was no proper yield on account of the fog.
..	..	2nd February ,,	127	4·70	..	17	..	The crop was affected by a disease called *Nullagigy*.
..	17·65	15th March ,,	148	75·00	..	234	..	
116	17·35	2nd June ,,	225	82·00	..	410	..	
29	20·00	Thrice a week from 29th January 1882.	..	5·70	..	57	..	
LUXURIANS.								
				Grain, Measures	Straw, Bundles	Grain, Measures	Straw, Bundles	
31	20·80	15th February 1882	147	3	2	75	50	
34	21·40	4th ,, ,,	138	32·00	182	290	1,654	
..	..	20th ,, ,,	88	8·00	80	50	500	
The land was wet for 15 days.	..	26th November ,,	263	26·00	875	520	17,500	
..	..	9th January ,,	183	15·20	..	37	..	
(SORGHUM KAFFRARIUM).								
				LB.	LB.	LB.	LB.	
5	1·19	30th January 1882	112	·30	·60	·30	·60	
5	1·19	30th ,, ,,	112	·30	·60	·30	·60	
..	..	9th ,, ,,	183	23·50	..	57	..	
..	..	28th December 1881	..	..	100	..	5,000	
..	..	20th February 1882	106	8·00	80	50	500	
1	·45	22nd and 23rd March 1882.	106	379·50	780	506	1,040	
3	·35	28th April 1882	127	·30	168·7	4·4	699·5	
Not stated.	Not stated.	1st July ,,	98	6·50	1,000	25	3,846	

Number.	General nature of Soil.	Area of Land sown.	Kind and Quantity of Manure used.	Pounds of Seeds sown.	Date of Sowing.	Percentage of Vital Grain in the Seed sown.	Number of times irrigated.
							CHINESE SUGARCANE
	TINNEVELLY DISTRICT.	ACRES.		LB.			
1	Red soil	·01	10 cart-loads of dung and 4 cart-loads of clay.	1·25	6th November 1881	Not known.	..
							CASTOR
	COIMBATORE DISTRICT.						
1	Red loam, third-class dry land.	Area not known	....	·03	3rd September 1881	Not known.	16 times ..
	TINNEVELLY DISTRICT.						
1	Dry land	·15	240 lb. sweepings and 80 lb. sheep manure.	2·45	4th November ,,	80	..

Number of Inches of Rainfall.		Date when Crop harvested.	Duration of growth.	Outturn per Plot.		Outturn per Acre.		Remarks by the Reporters.
Wet days.	Inches.			Cotton in Seed.	Straw.	Cotton in Seed.	Straw.	
(SORGHUM SACCHARATUM).								
..	..	29th February 1882.	DAYS. 115	LB. 3·00	..	LB. 300	..	
BEANS.								
2	1·50	6th February 1882.	156	Small measure. ¾	..	..	..	In ·02 acres; the greater part was occupied by cotton, castor-seeds were sown in a line in a corner.
19	12·05	10th May ,,	187	34·30	..	228	..	

Extracts from letters on District Field Experiments.

EXTRACT from a letter from the Acting Head Assistant Collector of Bellary, dated 26th April 1883.

"Of the 118 lb. of Australian Maize received from your office, 100 lb. were sent to Hadagalli, 4 lb. to Hospet, 6 lb. to Kúdligi, and 8 lb. to Harpanahalli as requested by the respective Tahsildars. They were sown in July and August last, and harvested in October and December succeeding. The produce on' the whole is very poor. In Kúdligi Taluk it was a complete failure.

"In Hospet Taluk the seed was sown in six villages; in two it succeeded a little and in four there was a total failure.

"In Harpanahalli the seed was sown in six villages; in five villages there was utter failure, and in Kusba Harpanahalli the produce was very poor.

"Of the quantity supplied to Hadagalli, only 30 lb. were sown in two villages and the produce was 105 maunds. The remaining quantity of seed is reported to have been damaged."

EXTRACT from a letter from the Vice-President, Municipal Commission, Coimbatore, dated 9th April 1883.

"Maize throve very well. Each stem was more than eight feet in height, and the cobs were very large. I have read that some of the largest ears in America contain at least 800 grains; but I counted more than that number in some of the largest cobs produced here. There is, however, no demand whatever for the maize at this place, as the people do not know how to make use of it."

EXTRACTS from letters from the Collector of Kurnool, dated 10th July 1882 and 10th May 1883.

"I am getting the American Maize, which you sent us, distributed among well-to-do ryots, and they seem much struck with the size of the seeds."

"The experiment was a failure. The stalks were slightly taller and thicker than those of the country maize; but in several cases no ears were produced and where there were ears they were not as well filled as those of indigenous maize ordinarily are. Again in the case of the indigenous maize each stalk bears two or three or sometimes even four ears, but in no case did the Australian Maize yield more than one ear."

EXTRACT from a letter from the Acting Head Assistant Collector in charge, Anantapur, dated 8th June 1883.

"Experiments with Australian Maize have not been successful in some cases, while in others the result is not yet known."

EXTRACT from a letter from the Acting Sub-Collector of Coimbatore, dated 19th April 1883.

"These were chiefly Hawkesbury river maize and sorghum. I had the former planted out at the end of August, and when I saw them at the beginning of November, the crop was looking well. Heavy rains about that time beat it down greatly, but it recovered in a few days. The stalks were thick and cobs full, on some stalks two or three cobs appeared. The natives were very anxious to buy it, as in the hills about that division of Vizagapatam an inferior sort is much grown. The soil this crop was grown in was a light mould of middling quality."

EXTRACTS from letters from the Collector of Bellary, dated 10th April and 23rd May 1883.

"Mr. Sabapathy Moodelliar, while informing me of his omission to keep figures, states that the American species which he had grown some years ago excelled the Australian Maize both in quantity and quality.

"The Tahsildar of Bellary reports that the experiment made by him proved an utter failure."

EXTRACT from a letter from the Acting Collector of Tanjore, dated 30th March 1883.

"The experiment has not been a success in the three taluks of the sub-division and in Nannilam Taluk of the Head Assistant. This is mainly due to excessive rain at the time the plants flowered.

"Of the 15 lb. distributed to Patukóta Taluk only $3\frac{1}{2}$ lb. were actually sown, the remaining quantity having been eaten away by insects. The outturn is reported to be small owing to want of timely rain."

EXTRACTS from letters from the Deputy Collector on General Duty of North Arçot District, dated 28th June and 20th July 1882, and 31st March 1883.

"Maize plants flourished till they attained the height of one foot, when they turned pale, and, after producing ears, withered away entirely; consequently there was no harvest of that crop.

"The unsuccessful result in the Wandiwash Taluk, I am constrained to remark, is partly attributable to want of personal and due interest on the part of taluk officials in this important experimental cultivation. The crops of these seeds, which I myself raised in a few yards of ground in my own backyard, flourished well and yielded a sufficient quantity of grain.

"It appears that maize seeds were sown in $\frac{1}{8}$ cawni, while oil-seeds were sown in $\frac{1}{32}$ cawni, in the cusbah of Pólúr by one Thoni Peruma Gounden, but not a single seed germinated. This unsatisfactory result is, I think, owing to want of personal and due interest on the part of the taluk officials. I have warned the Tahsildar on the subject.

"The experiment seems to have failed in the Wandiwash Taluk, inasmuch as it is reported that the plants withered away after flowering.

"In the Arni Division the seeds were sown in three different places (one plot was close to my house and I personally supervised its cultivation) and the crops were harvested and yielded sufficient produce. The ryots, who tried the experiment, seem to have taken great interest in the matter, as also the Deputy Tahsildar."

EXTRACT from a letter from the Acting Head Assistant Collector of Cuddapah, dated 27th April 1883.

"The Tahsildar of Jammalamadugu reports that the ryots were not willing to make experiments, and that the few who made them sowed the seeds mixed with others, and that they have come to a conclusion that this grain has less taste than the country one, and the straw does not seem to suit the cattle. It appears from the statement furnished by the Tahsildar of Proddutur that experiments were made in thirteen villages. The crop was destroyed in nine of those villages by excessive rain, insects, &c., and the outturn in the crop of the remaining villages is not very satisfactory."

EXTRACT from a letter from the Acting Collector of Tanjore, dated 16th October 1882.

"M.R.Ry. Dorasawmi Mupanar of Kapistalam reports that the 42 lb. of Madagascar paddy, sown by him, yielded only $1\frac{3}{4}$ markals, and attributes the failure to the unseasonable distribution of rain and to his wet lands being low."

EXTRACT from a letter from the Acting Collector of Madura, dated 18th May 1882.

"The columns 14 to 17 of the latter statement are left blank as the information required to be filled up therein could not be obtained from the cultivator, who cut the crops and used them as fodder for his cattle then and there."

EXTRACT from a letter from the Tahsildar of Coimbatore, dated 3rd July 1882.

"The ryots to whom the above 21 lb. were distributed report that the crops grown by them in some of the fields entirely failed for want of water and that in the others the seed did not germinate at all. Out of the balance of 19 lb., 15 lb. of paddy were sown in the jungle conservancy garden near the female latrine, and I beg to send herewith a statement showing the result of the experiment. The outturn was, as will be seen, 1,420 lb. per acre."

EXTRACT from a letter from the Acting Head Assistant Collector of South Arcot, dated 28th April 1882.

"Tahsildar of Chidambaram reports that he distributed the Madagascar paddy seed received from the Saidápet Farm to two ryots; one of them states that the plants did not come up."

EXTRACT from a letter from the Collector of North Arcot, dated 10th April 1882.

"I undertook the cultivation of a portion of the Madagascar paddy seed sent by you and for this purpose rented for Rs. 17 one-fourth cawni of wet land situated close to my house at Chittoor. I personally superintended the experiment, the result of which is embodied in the accompanying tabular statement, showing an outturn of 2,551 lb. per acre.

"In his letter, No. 53, dated 2nd instant, the Zemindar of Punganúr, to whom a certain quantity of Madagascar paddy and a portion of the Sorghum saccharatum and castor-seeds sent by you last year were forwarded for experimental cultivation, informs me that the cultivation of the Madagascar paddy in his estate was a complete failure, and that the season for the cultivation of the other seeds was over by the time he received them. He further states that the ryots of his Zemindari decline to experiment with Sorghum saccharatum.

"The Jaghiredar of Arni, to whom the above-mentioned seeds were also sent for experimental cultivation, states in his letter, No. 8, dated the 2nd instant, that they were sown in good soil, but have not sprouted with the exception of the Madagascar paddy which thrives well and resembles the kar paddy crop of this country."

EXTRACT from an arzi from the Tahsildar of the Kadiri Taluk of Cuddapah, dated 30th January 1882.

"I beg to report for your information that paddy received with takeed, No. 1017, dated 20th October 1881, was sown but did not germinate and the seeds remained in their original states, became useless."

EXTRACT from the Acting Head Assistant Collector of Cuddapah, dated 8th July 1882.

"The Tahsildar reports that Madagascar paddy is not suited to this soil, it grew to only about a span's height and then withered."

EXTRACT from a letter from Mr. P. D. RANA, of Baroda, dated 7th August 1882.

"It gives me pleasure to inform you that the New Orleans cotton throve admirably in some parts here."

EXTRACT from a letter from the Acting Sub-Collector of Coimbatore, dated 21st August 1882.

"* * showing the result of the experiment made with New Orleans cotton-seed was a complete failure."

EXTRACT from a letter from the Acting Head Assistant Collector of Cuddapah, dated 8th July 1882.

"New Orleans cotton-seeds were sown. The cotton is said to be whiter than the ordinary cotton raised here; but as the seeds are not liked by cattle, the ryots decline to grow this cotton again."

EXTRACT from a letter from the Tahsildar of Kadiri Taluk of Cuddapah, dated 25th April 1882.

"The cotton-seeds given to Darigallu Narayana Reddi were casted and germinated in five days, but the plants were only alive for a day or two, while those given to Patnam Rami Reddi did not germinate at all."

EXTRACT from a letter from the Acting Deputy Collector on General Duties, South Arcot, dated 20th May 1882.

"The experiment made with Reana luxurians in a village of the Tirukoilúr Taluk appears to have been successful. The seed sown weighed half a pound and the yield 25 lb. or fifty times the seed. There was also a produce of 165 lb. of fodder."

EXTRACT from a letter from the Acting Head Assistant Collector of Cuddapah, dated 8th July 1882.

"The Tahsildar reports that Reana luxurians is not suited to this soil; it grew to only about a span's height and then withered."

EXTRACT from a letter from the Collector of Malabar, dated 12th May 1882.

"A few seeds of the Reana luxurians were sent to the Head Assistant Collector, who informs me that the experiment ended in a failure."

EXTRACT from a letter from Mr. P. D. RANA, of Baroda, dated 7th August 1882.

"It gives me pleasure to inform you that the Sorghum throve admirably in some parts here. The juice from the canes had been extracted and turned into jaggery by the ordinary process. It would have been considered a thorough success were it not for the jaggery becoming sticky and slightly unpalatable. The more it was reduced to a thicker consistence, the more it became sticky, and the taste of the jaggery was slightly bitter."

EXTRACT from a letter from VANKARAKUNTA CHINNA CHINNA REDDI, of Kadiri, Cuddapah District, dated 18th April 1882.

"The sugarcane-seed given me were sown, but did not germinate."

EXTRACT from a letter from the Deputy Collector on General Duty, Cuddapah, dated 16th September 1882.

"Cultivation in Pullampet Taluk proved a failure. In the villages of Ittigulapaud, Sanisettipally and Katteragandla, Badvél Taluk, the cultivation was attended with the same results owing to some disease. Cultivation at Sidhout, under the direct supervision of myself and the Tahsildar, has been carried on with some success, and the results are encouraging, while at Munneli and Kavalakuntla, though the crop lived to the final stage of being harvested, the results are poor.

"Canes of Sorghum kaffrarium are more juicy than those of any of the various sorts of Jowari of indigenous growth, and therefore must form rich fodder for cattle. It would therefore do well if its cultivation is encouraged."

EXTRACT from a letter from J. HEIMPEL, Esq., Dindigul, dated 11th April 1882.

"You were also kind enough to give me some seeds of a Chinese sugarcane; I have planted the seeds, but regret that the result was not satisfactory. The produce is in my opinion no sugarcane, but a short stalked cholum of a good quality."

EXTRACT from a letter from the Acting Collector, Godávari District, dated 4th May 1883.

"I have the honor to inform you that Amber sugarcane was the only seed obtained last year from the Saidápet Farms for experimental cultivation in this district.

"The Sub-Collector who tried the experiment in the sub-division reports that its cultivation was a total failure."

EXTRACT from a letter from the Acting Head Assistant Collector in charge of Kurnool District, dated 1st May 1882.

"The two taluks of Rámallakót and Nandikótkur were chosen, as being near to head-quarters, and the seed Sorghum kaffrarium was sown in each of the three different kinds of soil that we have in the district, viz., ragada, or black cotton, mussab, or brown clay, and lal, or red gravel, some of the lands being manured and some not.

"The excessive drought, however, of last year has made the experiment a failure; the seed was sown late and thus missed the heavy rains of August and September, while the late rains practically failed.

"It should, I think, be tried once more, for the seed had certainly not fair play."

EXTRACT from a letter from the Tahsildar of Villupuram, dated 19th April 1883.

"I distributed the Sorghum seeds among the Revenue Inspectors, Deputy Tahsildar and myself. Considering that the soil of the Villupuram Sub-jail compound would be well suited to the growth of the crop, one-fourth of a measure was sown on 3 cents of land. It was well

manured, irrigated and carefully watched. The crops flourished very well and ears each about ½ or ¾ lb. of a foot in length sprung up. When the seeds began to appear they were attacked by squirrels. All precautionary measures were adopted by me to check the attack of squirrels, but they were all in vain. At nights these squirrels ate away all the grains. As they were about to be imbibed with milk and left after all no grains in the ears.

"The sites selected by these for sowing the seeds are reported to be fit for the growth of garden products. Still the crops did not thrive well because the roots while they were young were eaten away by white-ants. In some cases no plants appeared on the ground.

"The Revenue Inspector of Vikravaundy has reported that the experiment made by him was a failure owing to the attack of squirrels.

"The Revenue Inspector of Valdanoor Firka has made a favorable report. He entrusted three-quarters of a lb. of seeds to some respectable ryot of Valdanoor, who had sown the seeds on 4 cents of land. The growth was luxuriant and they grew to an average length of four and half feet. The outturn on the said piece of land was 37½ lb.

"I consider that the ryots to whom the other Revenue Inspectors entrusted the seeds have not taken proper interest in the experimental cultivation of the kind of cholum. As to the growth of the same in the sub-jail compound under my supervision, I think that a further experiment with more precautionary measures and care would be a success, taking into consideration the richness of the soil and the manner in which the crops thrived."

Extracts from letters from A. G. Nicholson, Esq., of Hawthorne Estate, Yercaud, dated 29th September 1882 and 22nd June 1883.

"You will be glad to hear that the Sorghum Saccharatum and Planters' Friend, of which you sent me the seed, are doing very well.

"I have a great pleasure in enclosing a report on my experiments with Planters' Friend, Sorghum Kaffrarium and Sorghum Saccharatum; of the latter I do not think much, it only grew about six feet high with stems as thick as my finger, and the cattle did not care for it and very little has come up again this year. But I am greatly pleased with the Planters' Friend, it grew about eight feet high with stems nearly one inch in diameter and the cattle liked it, moreover last month from the old roots a thicker crop than that of last year sprang up. It is now eight feet high, and I am cutting daily for the cattle, only apparently to increase the number of shoots from each root.

"Every one who sow the Planters' Friend asked for and obtained seed, without the knowledge that it would come up the second year, without sowing. I have done nothing to the ground, it has choked out the weeds."

Extract from a letter from the Acting Sub-Collector of Coimbatore, dated 19th April 1883.

"The sorghum and other kinds of cholum did well, but I do not think it suits the native idea there; thin cholum produces a heavier and larger grain though the produce of a stalk is in bulk, I think, less than the cholum I was growing. I regret to say that I was unable to try crushing the black cholum for jaggery, being unavoidably absent during the time the crop was fitted for trying it, and when I ordered it to be tried it was found too dry and old. From the cholum and maize I saved 500 lb. of seeds."

Extract from a letter from the Acting Head Assistant Collector of Cuddapah, dated 8th July 1882.

"As regards the experiment with the two kinds of cholum called China Sugarcane and Planters' Friend, the Tahsildar says that cattle prefer the ordinary cholum straw to that obtained from the two species under experiment. The seeds are very small and the green seeds have rough taste. The ryots say that these two kinds of cholum will not be nice when cooked; and that they are not in any way more profitable than the ordinary jonna of the country. They decline to sow these seeds again."

Extract from a letter from the Deputy Collector on General Duty, North Arcot District, dated 28th June 1882.

"From the same it would appear that oil-seeds were sown in eight acres of land in the village of Agaracarakotai. It seems that only one-third of the oil-seeds germinated a few days after the seeds were sown and the rest died away. Oil-seed plants were in a healthy condition for some time after growth; but half of the plants soon withered away, and the rest yielded a very insignificant produce, viz., a Madras measure, 112 tolas."

EXTRACT from a letter from the Acting Collector of Madura, dated 18th May 1882.

" As regards the castor beans, the Tahsildar states that the seeds sown in one locality never germinated, and those in another sprouted but perished soon afterwards. The Tahsildar thinks that the seed may be bad."

EXTRACT from letters from the Tahsildar of Kadiri, Cuddapah District, dated 25th April 1882.

" The oil-seeds given to Nallamadi Chinna Chennu Reddi were sown but did not germinate.

" The oil-seeds given me were casted, but did not germinate.

" Under your instructions, the 2 lb. of oil-seeds given me were casted abroad in twenty cents of soil. They germinated after five days and the plants remained alive only for a day or two."

EXTRACT from a letter from the Acting Sub-Collector of Coimbatore, dated 21st August 1882.

" Showing the result of the experiment made with castor beans in Minnampally village, Karúr Taluk. It will appear from the statement that the experiment was a complete failure."

EXTRACT from a letter from J. HEIMPEL, Esq., Dindigul, dated 11th April 1882.

" The sundry tobacco seeds you were kind enough to give me I have put in the soil and the result is in some instances satisfactory.

" The lanka turned out well, but will only be suitable as *pipe* tobacco and not for cheroot manufacture. Some of the seeds did not come up at all, most likely because they were too old. The seeds of the Dindigul tobacco turned out an inferior sort, but this most likely must be attributed to the poor soil in which I planted the same which, however, I had highly manured.

" This district is very suitable for tobacco cultivation and would turn out very superior tobacco if the ryots would bestow more careful attention to the cultivation and preparation of the tobacco and in using two years' old seeds instead of quite fresh seeds ; it has been proved in Germany that fresh seeds ought not to be used for the cultivation."

EXTRACT from a letter from the Acting Collector of South Canara, dated 24th August 1882.

" With reference to your letter, No. 342, dated 14th March 1882, I have the honor to inform you that the experiments made with the seed of castor beans, Sorghum Saccharatum and Planters' Friend were so uniformly unsuccessful owing to the failure of the earlier rains last monsoon, that I think it unnecessary to send you a detailed report."

EXTRACT from a letter from the Acting Collector of Tanjore, dated 16th October 1882.

" M.R.Ry. Tavasumuthu Nadar states that he tried the Madagascar seed both in wet and dry land, but that it did not germinate. The same result attended his experiments with New Orleans cotton seed. As regards China Sugarcane and Planters' Friend, they grew to a height of three feet, but were totally destroyed by the late floods. Ten castor plants are reported to be now growing."

EXTRACT from a letter from the Collector of Malabar, dated 12th May 1882.

" The seeds of the castor bean and Planters' Friend together with some of the Reana Luxurians were sent to the Deputy Collector of Wynaad, who, I regret to state, now reports that no distribution was made as none of the planters cared or were willing to try the experiment under the conditions of filling up the forms and being obliged to report results."

EXTRACT from a letter from the Collector of Tinnevelly, dated 10th April 1883.

" I regret to observe that the results are unsatisfactory, chiefly because the experiments were not conducted properly for want of the requisite time and knowledge on the part of the Taluk Officers. No doubt the crops might succeed under better management ; but, as I have reported over and over again, Revenue officials are, as a rule, the very worst people to select as experimentalists.

" I have strongly impressed on all my Divisional Officers and Tahsildars the necessity of their devoting more personal attention and care to these experiments if they choose to make them, and hope that in future the results will not be quite so useless."

PART III.

REPORT ON THE SAIDAPET EXPERIMENTAL FARM.

The Weather.

First quarter (*April, May, and June*).—During the quarter, the rainfall measured ·95 inches, which was nearly 6 inches below the average amount in the corresponding period of the previous ten years; there was no rain whatever in either April or May; and, in June there were only three days on which rain was measured. The weather was unusually hot, especially in the latter part of the quarter. During nearly the whole of June, the maximum daily temperature ranged between 102, and 108, degrees, in the shade; while, the minimum temperature was under 80 degrees only on two days in the whole month. The consequence of this high range of temperature, with the absence of rain, was, the almost entire cessation of vegetable growth. On the more sandy land, a considerable number of trees and shrubs died, some of which had been frequently watered; but, the evaporation was so great, ordinary surface watering had but little effect. It was, of course, impossible to do anything in cropping the unirrigated land during the quarter. The land watered by means of water-lifts was devoted chiefly to growing green fodder for the stock, but the expense was considerable, such an unusually large quantity of water was required per acre.

2. *Second quarter* (*July, August, and September*).—The amount of rain registered in the quarter was 12·02 inches which fell on thirty-five days; the fall was 1·83 inches below the average amount, in the corresponding period of the previous ten years. During July, the showers were frequent but very slight: though, there were fifteen days on which rain fell, the total fall was only $2\frac{3}{4}$ inches, the rain was not therefore, sufficient to admit of land being thoroughly ploughed which, had become hard from the long drought. Though of but little use as regards facilitating tillage and cropping operations, the rain was, of course, beneficial to growing crops. The rainfall of August was nearly twice as heavy as that of July and, was rather above the average fall of the month; considerable progress was made in getting the land ready for the cold-weather cropping. In September, the rainfall was *very* disappointing; the total fall was $3\frac{1}{2}$ inches, but 3 inches of this, fell during the first five days of the month. Advantage had been taken of the seasonable weather in the latter part of August and early part of September, to get in a considerable breadth of crop; but, the drought which continued from the 5th of September to the end of the month proved very disastrous to young crops, more especially as, the temperature at the time was unusually high, the range of the maximum thermometer in the shade, from the 5th, to the end of the month, having been from 93, to 100 degrees. The rainfall in September, was fully 6 inches below the average fall of the same month in the previous ten years. A deficient rainfall in September, especially if accompanied by clear bright weather, always proves detrimental to the interests of the Farm; for the prevailing soils are so sandy, crops cannot mature on them unless at the time when the rain ceases, they are in an advanced stage of growth and, to secure this, the crops should be sown very early in September.

3. *Third quarter* (*October, November, and December*).—The rainfall measured during the quarter was 36·84 inches which is 7·28 inches above the average fall

measured in the same period during the previous ten years. The rainfall of this quarter was very extraordinary. In October, the weather was very favorable for agricultural operations of all kinds; not only was the rainfall well distributed but, the range of the temperature in the month, was very favorable to growing crops, and these made rapid progress after the long drought of September; during the month, a considerable area of ground was planted with Guinea grass, and trees. In November, the rain was most excessive, the total amount measured having been 28·47 inches, precipitated on sixteen days, on three of which the fall was, respectively, 5·42 inches, 4·80 inches, and 3·50 inches. From this deluge of rain much of the land became flooded and, all crops in an advanced stage, were broken down and damaged greatly. Unfortunately at this time, most of the maize, of which there was a considerable breadth, was in full flower, and, by the washing away of the pollen of the flower, the fertilization processes were checked, and, prevented. The average monthly fall of November, in the previous ten years was only about 13·52 inches. Had the heavy monsoon rains occurred at the usual time, the maize crop would not have been so far advanced, and would not have suffered so seriously. The Mylapore tank which, up to this period, had contained no water that could be utilized from the sluice, was quickly filled, and great volumes of water ran over the calingulah which was very low at the time, to the sea. The deluge of November, was followed by an extraordinary drought in December; there was no rain in this month excepting one slight shower which, measured only ·03 inches. The result of this sudden change in the weather from *extreme* wetness, to *extreme* dryness was, of course, very injurious to all crops.

4. *Fourth quarter (January, February, and March)*.—There was no rain whatever during this quarter. The drought, which commenced on the 1st of December, very soon put a stop to the rapid growth which had characterized the crops in October and November. This, caused them to flower before being fully developed and a large proportion of the plants either bore very inferior grain, or produced none; while, the yield of straw was also greatly lessened. Every year's experience goes to show how precarious are unirrigated crops on the poor sandy soils of the Farm. The temperature was low during the quarter, and, the dew was heavy on some mornings while, fogs, prevailed almost to the same extent as in the previous year though beneficial, these did not compensate for the absence of the usual rains in December, the midday heat being so great at the time.

5. The total rainfall of the year was 49·81 inches, against 51·88 inches, the average annual fall in the previous ten years. It will be noticed that the fall of rain was only about 2 inches below the average annual fall, and yet the cropping season, was undoubtedly a very bad one. This, illustrates the danger of forming an opinion about a season, on the *amount* of the rainfall, without reference to the manner of its distribution —a point which, has so frequently been dwelt on in these reports—thus, in a short cropping season of five months only, two of the months, the most important, were characterized the one by a deluge of rain, and the other, by a severe drought.

6. The following statement, shows the rainfall in each quarter of the year, compared with that of the same periods, in the previous ten years:—

—	1882-83.		Average of previous Ten Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
	INCHES.		INCHES.	
First quarter	·95	3	6·86	8·6
Second do.	12·02	35	13·85	26·4
Third do.	36·84	29	29·56	29·7
Fourth do.	...	...	1·61	2·3

7. The usual detailed statement of the rainfall follows:—

Date.	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1st	..	..	..	·07	..	·07	1·20	..	·03	..	..	..
2nd	..	..	..	·15	·23	·01	·75	..	..	..	..	..
3rd	..	..	·09	..	·05	2·45	..	..	..	..	..	..
4th	..	..	..	·05	..	·07	..	..	..	..	..	..
5th	..	..	..	..	..	·35	..	1·87	..	..	..	..
6th	..	..	..	·16	..	..	·05	..	..	..	..	..
7th	..	..	..	·46	..	..	..	..	..	..	..	..
8th	..	..	..	·02	·08	..	..	·07	..	..	..	..
9th	..	..	..	·07	·68	·06	..	..	..	..	..	..
10th	..	..	..	..	·23	..	..	..	..	..	..	..
11th	..	..	..	1·00	·01	..	·46	·45	..	..	..	..
12th	..	..	..	..	..	..	·13	..	..	..	..	..
13th	..	..	..	..	..	..	1·15	..	..	..	..	..
14th	..	..	..	·06	·22	..	·01	..	..	..	..	..
15th	..	..	..	..	..	..	1·20	·85	..	..	..	..
16th	..	..	..	·15	..	·58	..	3·50	..	..	..	..
17th	..	..	..	..	..	..	..	2·50	..	..	..	..
18th	..	..	..	..	·17	..	..	·80	..	..	..	..
19th	..	..	..	..	·32	..	..	..	..	..	..	..
20th	..	..	..	..	·14	..	·20	..	..	..	..	..
21st	..	..	·01	..	1·42	..	1·15	·82	..	..	..	..
22nd	..	..	..	..	..	..	1·77	·75	..	..	..	..
23rd	..	..	..	..	..	..	..	2·60	..	..	..	..
24th	..	..	..	·32	..	..	..	4·80	..	..	..	..
25th	..	..	..	·07	..	..	..	·05	..	..	..	..
26th	..	..	..	·07	·68	..	..	1·90	..	..	..	..
27th	..	..	..	..	..	..	..	·22	..	..	..	..
28th	..	..	..	..	1·40	..	..	..	..	..	..	..
29th	..	..	..	·03	..	..	..	5·42	..	..	..	..
30th	..	..	·85	..	..	..	·27	1·87	..	..	..	..
31st	..	..	..	·12	..	..	..	..	..	..	..	..
Total ..	*Nil.*	*Nil.*	·95	2·80	5·63	3·59	8·34	28·47	·03	*Nil.*	*Nil.*	*Nil.*

8. Other detailed statements of rainfall will be found in the Appendix.

Crops.

9. Fungoid diseases excepting "rust" were not prevalent amongst the crops. The invariable practice on the Farm is to dress all seed with sulphate of copper, but this dressing appears to have no effect in preventing "rust," the attack of which is usually very sudden and widespread, whenever rapid vegetable growth is suddenly stopped by a drought. The sowing season in September, was a very unfavorable one, while the deluge of rain in November followed by the drought, which lasted during the remainder of the year, together proved very injurious to crops. In many fields, the outturn of grain was not more than one-half the yield that would have been obtained in a favorable season; while the sample of grain was generally very inferior, small and shrivelled. The paddy crops, were again severely attacked by a fly, this deposits its eggs near the nods or joints in the straw, the larvæ are hatched within the straw and, eating their way upwards, cause the ear to become abortive. As the depredating insect is inside the straw, little can be done to stop its ravages; but it has been found that by draining the land and drying it for a few days, good results are obtained; attributable partly, to the effect on the plant of the restoration of healthy action in the soil, and partly, to the temporary interruption in the flow of sap within the plant, proving detrimental to the insect. It was invariably observed that the damage was greatest on low situated land, where the irrigation water stagnated. There is, in the locality of the Farm, a considerable loss every year in the paddy crop caused by the insect under notice, which, finds very favorable breeding-places in the paddy swamps, so numerous in the Chingleput District.

10. The total area under crops was 139·01 acres; 21·12 acres were under crop which stood throughout the whole year, and, 3·69 acres were under crop ploughedin,

as, green-manure. Of the remainder of the land, a portion was planted with trees and a small area was fallowed.

FODDER CROPS.

11. Fodder crops were raised on 71·26 acres, of which area 6·46 acres were sown before the commencement of the year, while one acre was standing at the close of the year; and, 9·04 acres were under Guinea grass planted before the beginning of the year, and 6·98 acres planted during the year.

12. As was pointed out at paragraph 10 in the last report, a considerable proportion of the fodder crops of the Farm, consist of "catch" crops, taken whenever opportunity arises, without any reference to the time of year, the consequence is, that full crops are not always obtained but, every one conversant with farming details in South India, is aware what a boon is, a supply of green fodder to dairy stock in the hot dry season; at such a time, a crop of green fodder of only half a ton per acre, may be worth more than a crop of two tons per acre, in the ordinary cropping season. The total outturn of green fodder from 71·26 acres, was 212,676 lb. or 2,970 lb. per acre. In the previous year, the average outturn of fodder, per acre, was 3,307 lb. Many of the fields afforded grazing for some time in addition to the produce harvested; this, specially was the case with Guinea grass thus, Field No. 1, measuring 2⅓ acres, besides yielding 12,785 lb. of green fodder during the year, afforded grazing for nine cows and, a number of calves, for several months. Guinea-grass fodder is generally fully utilized, for, it consists almost entirely of leaves which, can be eaten in comfort, by either old, or, young stock.

13. It should be remembered that the crops tabulated in the following statement, were produced under very varying conditions, and, at different times in the year. Guinea grass, usually stands on the land from two to three years; the bulk of the Guinea grass is regularly grazed during the dry season, and is cut only in the cropping season; it was necessary to graze some of the fields closer than others, hence they differed considerably in outturn. Planters' Friend, it will be observed again, yielded very well, and matured in a remarkably short growing season, an outturn of 5,000 lb., per acre, having been obtained, with occasional irrigation in fifty-one days. Cumboo yielded well, and it also occupied the land but a short time. Some of the outturns of horse-gram fodder are good, bearing in mind the character of the season; thus, Field No. 10, gave an outturn of 6,592 lb. of fodder per acre, in a growing season of ninety-six days which, was characterized by *the entire absence of rain;* the soil, however, was in a very good manural condition.

14. *Reana Luxurians.*—A small plot was sown with this crop; the outturn of green fodder was at the rate of 38,400 lb. per acre, a very large outturn; but, the cost of production was great for, it was necessary to irrigate the land nearly every other day, from sowing until harvest. Reana is undoubtedly a very heavy producer, crops grown on the Farm have given enormous yields but further experience, confirms the opinions expressed regarding the crop in the last report—

> "On good soils, under liberal treatment, when it can obtain plenty of rain or irrigation water, the crop grows most rapidly and luxuriantly; but it cannot withstand a drought. Indeed the experiments made showed that a drought, which scarcely affected the Sorghum crops, was sufficient to check the growth of the Reana to such an extent, as to render it useless to keep the crop standing longer. As a fodder crop, in a damp warm climate, or where irrigation can be secured, it is well worthy of attention. There is perhaps no other crop, sugar-cane excepted, which will produce such an enormous quantity of green plant per acre, but the fodder is very watery, and does not appear to be very palatable to stock when offered for the first time. The watery juices of the stem, seem to be destitute of saccharine matter, during all stages of growth."

When Yellow Cholum (*Sorghum vulgare*) is grown, under the very favorable conditions needed to secure a fair crop of Reana, it will yield very heavily and, produce a far superior fodder to Reana, while a good crop of yellow cholum fodder may be produced under conditions, to which were the Reana exposed, it would utterly fail. For milch cattle Reana fodder is not nearly so good as cholum fodder; it is not that cows fed

on Reana yield less milk, but, the milk is poorer. An experiment was made with Reana, and cholum fodder, in feeding a dairy cow, the following are the results ;—

Date.	Cow.	Weight of Cow.	Oil-cake.	Bran.	Dholl husk.	Kind of Green Fodder.	Quantity of Fodder.	Rejected Fodder.	Milk obtained.
		LB.	LB.	LB.	LB.		LB.	LB.	* MEAS.
9th May 1883	Kerry Cow.	599 weighed at 5-15 morning.	4	2	2	Reana.	75	3	4·50
10th ,, ,, ...	Do.	..	4	2	2	Do.	75	2·50	4·50
11th ,, ,, ...	Do.	..	4	2	2	Do.	75	3	4·50
12th ,, ,, ...	Do.	..	4	2	2	Do.	75	8	4·50
13th ,, ,, ...	Do.	..	4	2	2	Do.	75	7	4·50
14th ,, ,, ...	Do.	..	4	2	2	Do.	75	15	4·50
15th ,, ,, ...	Do.	..	4	2	2	Do.	75	20	4·25
16th ,, ,, ...	Do.	..	4	2	2	Do.	75	23	4·25
17th ,, ,, ...	Do.	..	4	2	2	Do.	75	41	4·25
18th ,, ,, ...	Do.	..	4	2	2	Do.	75	47	4·12
19th ,, ,, ...	Do.	570	4	2	2	Yellow Cholum.	75	20	4·25
20th ,, ,, ...	Do.	..	4	2	2	Do.	75	21	4·50
21st ,, ,, ...	Do.	..	4	2	2	Do.	75	22	4·25
22nd ,, ,, ...	Do.	..	4	2	2	Do.	75	12	4·37
23rd ,, ,, ...	Do.	..	4	2	2	Do.	75	9	4·37
24th ,, ,, ...	Do.	..	4	2	2	Do.	75	11	4·37
25th ,, ,, ...	Do.	..	4	2	2	Do.	75	10·50	4·37
26th ,, ,, ...	Do.	..	4	2	2	Do.	75	14	4·37
27th ,, ,, ...	Do.	..	4	2	2	Do.	75	10·50	4·37
28th ,, ,, ...	Do.	..	4	2	2	Do.	75	11·25	4·37
29th ,, ,, ...	Do.	589	..	..	..	..	..	10	..

It will be noticed that, the cow lost 29 lb. in weight during the ten days she was fed on Reana fodder ; while, her yield of milk fell from 4 measures and 4 ollocks per day, to 4 measures and 1 ollock. The cow, at first, contrary to usual experience took readily to the Reana fodder and consumed the unusually large quantity of 70 lb. per day ; but gradually, the fodder became less palatable to her and she rejected more than half of the quantity given on the last two days of the experiment. During the ten days the cow was fed on Reana fodder, the milk had a very unpleasant taste, similar to that of the milk of turnip-fed cows while, the quality of the milk was very poor, one measure, on the average, yielding only about 2 oz. of butter. On the eleventh day of the experiment yellow cholum fodder was substituted for Reana fodder, at first, the cow consumed only about two-thirds of the allowance of fodder, but, the quantity rejected daily, became less, until, her average consumption of fodder reached 65 lb. In the ten days the cow was fed upon yellow cholum fodder, she regained 19 lb. in weight ; while, her yield of milk increased from 4 measures and 1 ollock, to 4 measures and 3 ollocks and, the yield of butter, increased from 2 oz. to nearly 4 oz. per measure. The quantity of fodder given to the cow, was much larger than the usual allowance ; but, it was deemed desirable, to ascertain the utmost weight of each kind of fodder the cow would consume.

15. *Andropogon Halipense.*—This grass was introduced at the Farm about three years ago and, appears to be now well established, for it seeds very freely ; it is a large coarse-growing grass, 4 to 6 feet in height when full grown ; while the plant is young its fodder is very similar to that of Guinea grass, and it is eaten as readily by stock ; but, when fully grown its blades are hard and rough. This grass might with advantage be sown on the borders of jungles, and, on waste land for fodder.

16. *Panicum Brownii.*—This grass continues to thrive, and it also seeds well. Efforts are being made to extend its cultivation.

17. *Buffalo Grass.*—During the past two years this grass made little or no progress and, the whole of it died during the long drought. As a fodder producer on sandy soils, the grass has apparently little to recommend it, for cultivation in this part of India.

* A measure is 100 cubic inches.

18. *Bromus Schroederii.*—A packet of seed bearing this name, was received from the Collector of the Nílgiris, and a small plot was sown with it. The plants grew luxuriantly, they resembled very closely ordinary cumboo (*Penicillaria spicata*).

19. *Indigenous Grasses.*—A large number of packages of seeds of indigenous grasses, were received from Collectors, in response to applications made. Only a few of the seeds have yet been sown, the general results will be noticed in the next annual report.

20. *Subsoiling for Fodder Crops.*—A small experiment was made in Field No. 11 in subsoiling. Six plots were selected each of one-quarter of an acre, and, they were divided into two sets. The soil of set No. 1, is somewhat superior to that of No. 2. Both sets of experiments clearly show the advantages that result from deep tillage. The crop, yellow cholum, was sown on the 17th of October, and the fodder was cut green on the 30th of December:—

No. of Plot.	Area.	—	Produce.	Produce per Acre.
		First Series.		
	ACRE.		LB.	LB.
I	·25	Subsoiled to 12 inches	2,128	8,512
II	·25	Do. to 9 do.	2,056	8,224
III	·25	Ploughed as usual 5 inches deep (not subsoiled) ...	1,484	5,936
		Second Series.		
IV	·25	Subsoiled to 12 inches	1,814	7,256
V	·25	Do. to 9 do.	1,656	6,624
VI	·25	Ploughed as usual 5 inches deep (not subsoiled) ...	1,530	6,120

21. It has gradually become necessary to devote a larger area of the estate to the production of fodder; the Farm, has no pasture land and, its live-stock now so numerous, have to depend for fodder on the crops raised.

Description of Crop.	No. of Field and Plot.	Area of Plot.	Sowing.			Details of Harvesting.			Duration of Growth.	Rainfall.		Remarks.
			Date of.	Seed Sown.		Date of.	Outturn of Fodder			Inches.	Wet Days.	
				Total.	Per Acre.		Per Plot.	Per Acre.				
		ACRES.		LB.	LB.		LB.	LB.	DAYS.			
1. Guinea Grass	1 ..	2·38	6th Oct. 1881.	Planted.		From 8th Feb. to 23rd Oct. 1882.	12,785	5,372	257	21·04	49	
2. Do.	3 ..	1·78	8th Nov. „	Do.		From 9th Aug. to 19th Oct. 1882.	8,786	4,936	71	13·73	22	
3. Do.	15 B ..	4·00	25th Aug. 1882.	Do.		23rd Feb. 1883.	20,700	5,175	182	42·51	38	
4. Do.	21 A ..	2·97	2nd Oct. „	Do.		30th Dec. 1882.	3,374	1,136	89	35·64	29	
5. Do.	22 ..	·66	In 1880 ..	Do.		2nd Oct. „	740	1,121	185	14·92	40	Grazed by cattle.
6. Do.	27 A ..	2·17	In „ ..	Do.		24th Feb. 1883.	3,107	1,431	330	49·81	69	Do.
7. Do.	27 B ..	2·05	9th Nov. 1881.	Do.		3rd „ „	4,057	1,979	309	49·81	69	
8. Do.	B.G.A. 1	·01	8th July 1882.	Transplanted.		9th Sept. 1882.	454	27,467	63	10·49	28	
9. Planters' Friend	12 B ..	·26	15th Mar. „	10	38	6th May „	2,048	7,877	52	..	..	Irrigated.
10. Do.	12 D I ..	·32	27th Apr. „	10	31	17th June „	1,632	5,100	51	·09	1	Do.
11. Do.	18 ..	4·25	9th Sept. „	149	35	11th Dec. „	30,053	7,071	93	37·48	31	
12. Do.	22 ..	4·00	4th Oct. „	100	25	9th „ „	952	238	66	34·89	27	Grazed by cattle.
13. Do. and Yellow Cholum.	32 ..	1·00	23rd Sept. „	23	23	5th „ „	2,395	2,395	73	36·84	29	
14. Yellow Cholum	4 B III.	·87	4th Feb. „	40	46	29th July „	2,492	2,864	175	3·63	17	
15. Do.	11 ..	2·96	17th Oct. „	65	22	31st Dec. „	16,508	5,577	75	31·89	21	
16. Do.	31 ..	2·13	23rd Sept. „	71	33	6th „ „	3,918	1,839	74	36·84	29	
17. Sorghum Saccharatum	4 B III.	·52	11th Aug. „	22	42	19th Oct. „	1,600	3,077	69	12·90	23	
18. Do.	28 C ..	·99	3rd „ „	46	46	19th „ „	392	396	77	13·94	27	
19. Cumboo	4 A ..	·72	26th June „	26	36	12th Sept. „	5,852	8,128	78	12·29	35	
20. Do.	12 D II.	·34	24th „ „	19	56	19th Aug. „	2,402	7,065	56	5·32	24	
21. Do.	28 D ..	1·06	30th „ „	14	13	16th Sept. „	4,202	3,964	79	12·87	36	
22. Do.	30 A ..	1·80	1st July „	12	7	12th „ „	2,915	1,619	74	11·44	34	
23. Do.	30 B ..	1·99	30th June „	10	7	2nd „ „	1,890	950	65	9·36	31	
24. Do. and Horse-gram	23 ..	1·00	30th „ „	21	21	9th „ „	3,706	3,706	71	11·44	34	

Description of Crop.	No. of Field and Plot.	Area of Plot.	Sowing.			Details of Harvesting.			Duration of Growth.	Rainfall.		Remarks.
			Date of.	Seed Sown.		Date of.	Outturn of Fodder			Inches.	Wet Days.	
				Total.	Per Acre.		Per Plot.	Per Acre.				
		ACRES.		LB.	LB.		LB.	LB.	DAYS.			
25. Horse-gram	15 ..	1·03	2nd Jan. 1882.	26	25	12th May 1882.	479	465	130	·32	2	
26. Do.	21 A ..	2·97	8th July ,,	60	20	16th Sept. ,,	7,712	2,596	70	11·13	31	
27. Do.	23 ..	6·75	13th ,, ,,	90	13	6th Oct. ,,	14,103	2,089	84	01·42	30	
28. Do.	28 D ..	1·06	21st Jan. ,,	39	36	24th June ,,	4,443	4,191	154	·10	2	
29. Do.	29 B ..	·74	6th July ,,	25	34	16th Sept. ,,	2,240	3,027	72	11·75	32	
30. Do.	30 A ..	1·80	1st Jan. ,,	57	32	15th June ,,	6,447	3,582	136	·09	1	
31. Do.	36 B ..	·46	5th July ,,	30	65	14th Sept. ,,	2,801	6,089	71	11·17	33	
32. Do.	36 C ..	·90	5th ,, ,,	40	44	14th ,, ,,	2,145	2,383	71	11·17	33	
33. Do.	17 ..	1·00	14th Nov. ,,	20	20	9th Mar. 1883.	1,840	1,840	115	25·26	13	
34. Do.	10 ..	1·00	6th Jan. 1883.	30	30	12th Apr. ,,	6,592	6,592	96	..	..	
35. Do. Black Cholum, and Cumboo.	18 ..	4·25	16th Dec. 1882.	195	46	29th Mar. ,,	5,413	1,273	103	·03	1	
36. Car Paddy	R. F. 3..	·52	13th Feb. ,,	125	240	20th May 1882.	2,282	4,389	96	..	..	Irrigated.
37. Do.	,, 5..	·53	20th Mar. ,,	60	113	27th June ,,	2,489	4,696	99	·10	2	Do.
38. Sixty days' Paddy	,, 4..	·39	20th ,, ,,	60	154	19th May ,,	1,126	2,886	60	..	..	Do.
39. Do.	29 B ..	·34	6th Jan. 1883.	50	147	3rd Mar. 1883.	660	1,941	56	..	..	Do.
40. Do.	31 ..	·65	23rd Dec. 1882.	Planted.		2nd ,, ,,	1,422	2,187	70	..	..	Do.
41. White Car Paddy	31 ..	1·48	23rd ,, ,,	Do.		7th ,, ,,	1,712	1,158	74	..	..	Do.
42. Do.	36 A ..	1·58	28th Oct. ,,	150	95	28th Feb. ,,	2,766	1,750	123	28·77	18	Do.
43. Do.	37 E ..	·67	11th Nov. ,,	Planted.		13th Mar. ,,	445	664	122	26·56	15	Do.
44. Madagascar Paddy	34 B ..	·77	2nd Dec. ,,	Do.		26th Feb. ,,	1,724	2,239	86	..	..	Do.
45. Ragi	17 ..	2·00	7th Oct. ,,	50	25	20th Jan. ,,	1,507	753	105	34·84	·26	Do.
46. Reana Luxurians	B. G. N. Plot.	·12	7th Feb. 1883.	8	64	27th May to 15th June 1883.	4,800	38,400	109	..	..	Irrigated every other day.
47. Andropogon Halipense	B. G. A. 2.	·01	10th July 1882.	Transplanted.		9th Sept. 1882.	408	24,684	61	10·46	27	Irrigated.
48. Bromus Schroederii	A 5 ..	·01	25th ,, ,,	¼	15	25th Dec. ,,	160	9,680	153	46·35	53	Do.

Unirrigated Corn Crops.

22. These crops occupied 21·14 acres. Owing to the absence of seasonable rains, no hot-weather corn crops were sown, excepting for fodder. The following statement affords full information regarding the crops harvested :—

Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing.			Details of Harvesting.					Duration of Growth.	Rainfall.	
			Date.	Seed Sown.		Date.	Outturn.					Inches.	Wet Days.
				Total.	Per Acre.		Grain.	Straw.	Grain per Acre.	Straw per Acre.			
		ACRES.		LB.	LB.		LB.	LB.	LB.	LB.	DAYS.		
1. Maize	4 A ..	1·40	16th Sept. 1882.	81	58	20th Jan. 1883.	519	8,533	370	6,095	126	37·42	30
2. Do.	12 A ..	1·74	7th Oct. ,,	70	40	3rd Feb. ,,	266	12,262	153	7,047	119	34·84	26
3. Do.	13 ..	1·35	4th Sept. ,,	45	33	23rd Dec. 1882.	332	9,020	246	6,681	110	37·90	33
4. Do.	16 East ..	·92	12th ,, ,,	30	32	6th Jan. 1883.	188	7,728	204	8,400	116	37·42	30
5. Do.	16 West ..	·92	12th ,, ,,	39	42	6th ,, ,,	169	7,290	183	7,923	116	37·42	30
6. Broom Corn	10 A ..	1·15	9th ,, ,,	60	52	17th Feb. ,,	680	2,605	592	2,265	161	37·48	31
7. Do.	15 E I & II	2·00	8th ,, ,,	78	39	6th Jan. ,,	365	20,208	182	10,204	120	36·84	29
8. Do.	32 ..	1·68	23rd ,, ,,	43	25	6th Feb. ,,	195	4,784	116	2,847	135	36·84	29
9. Do.	14 ..	1·35	6th ,, ,,	32	23	20th Jan. ,,	360	3,290	266	2,437	106	34·89	27
10. Planters' Friend	32 ..	1·68	23rd ,, ,,	35	20	7th Feb. ,,	326	5,807	194	3,456	136	36·84	29
11. Dew Gram	15 West ..	2·16	20th Jan. ,,	35	16	15th Mar. 1882.	401	4,173	186	1,932	54	..	..
12. Sorghum Saccharatum ..	15 East ..	2·17	8th Sept. ,,	66	30	12th Jan. 1883.	575	16,308	265	7,515	126	36·84	29
13. Amber Sugar-cane ..	14 ..	1·00	6th Oct. ,,	10	10	3rd Feb. ,,	50	2,035	50	2,035	147	34·89	27
14. Do.	B.G.R. Plot	·12	19th ,, ,,	5	40	23rd to 26th Jan. 1883.	..*	1,375	..	11,000	96	31·89	21
15. Yellow Cholum	7 Sec. B.	·50	24th ,, ,,	18	36	8th Feb. 1883.	194	1,730	388	3,460	107	28·77	18
16. Do.	8 Sec. B.	·80	14th Sept. ,,	23	29	28th Dec. 1882.	548	4,017	685	5,021	105	37·42	30
17. Do.	B.G. Sec. C.	·20	27th ,, ,,	..	..	8th Jan. 1883.	72	1,690	360	8,450	103	..	..

* Weight of ears, 73 lb.

23. These crops, it will be remembered—*vide* paragraph 2 under Weather—had to contend with a long and severe drought just after they appeared above ground; while, when they were about two-thirds grown, and in flower, they were much injured by the wet stormy weather of November, and finally, they had to complete their maturing processes, in a severe and long-continued drought; the results of these very adverse conditions were, that a large proportion of the plants failed to produce grain; while, the grain yielded by those that did mature, was very light in weight and small. On deeper soils of a stiffer character, these adverse conditions would not have proved so disastrous; the soils of the farm, it must always be remembered, are extremely sandy, consisting on the average of over 90 per cent. of sand.

24. *Broom-corn* again throve well; it is apparently suited to the soils and climate of the Farm; but, the straw, is far inferior as regards nutritive properties to Sorghum straw. Broom-corn is grown in America, chiefly for its seed panicles, which are collected and made into brooms; but, in this country, they would be of but little use, for, wild grasses suited for making brooms, are abundant everywhere.

25. *Minnesota Early Amber Sugar-cane.*—Some further experiments were made in extracting the juice of this Sorghum, and in converting it into jaggery. The following statement affords full information regarding these experiments;—

Date of Experiment.	Where cane grown.	Weight of ripe stripped canes.	Weight of tops of canes with ears.	Time when crushing commenced.	Time when crushing was finished.	Quantity of juice obtained. Volume.	Weight.	100 lb. of canes yielded of juice.	Time when juice was put on the fire.	Temperature to which the juice was heated.	Time when the cream of lime was added.
1	2	3	4	5	6	7	8	9	10	11	12
1883.		LB.	LB.	A.M.	A.M.	MADRAS MEASURES.	LB.	LB.	A.M.	DEGREES.	P.M.
23rd January	B. Garden.	200	20	10-30	11-10	25	100	50	11-20	160	12-40
24th ,, ...	Do.	225	21	11	11-45	26½	106	47·1	P.M. 12-50	160	2
25th ,, ...	Do.	210	16	11-7	11-50	24	92	43·8	12-42	160	1-55
26th ,, ...	Do.	230	16	11	11-40	24	94	40·8	A.M. 11-50	160	12-40
27th ,, ...	No. 14.	170	20	11-45	P.M. 1	22	85	50	P.M. 1-15	182	2-18
29th ,, ...	Do.	190	16	11-30	12-45	25	99	52·1	1	182	2-10
30th ,, ...	Do.	201	14	11	A.M. 11-50	22½	90	44·7	12-50	182	2
31st ,, ...	Do.	200	18	10-45	11-26	24	96	48	12-30	182	1-45

(*Continued.*) Date of Experiment.	Quantity of cream of lime used.	Time when the juice was removed from the fire.	Temperature of the juice when removed from the fire.	Quantity of sulphuric acid used.	Time when the scum was removed from the juice.	Time when the juice was transferred to the boiling pan.	Weight of the scum removed.	Time when the evaporation was finished.	Weight of jaggery obtained.	100 lb. of juice yielded of jaggery.	100 lb. of stripped canes yielded of jaggery.
	13	14	15	16	17	18	19	20	21	22	23
1883.	OLLOCKS.	P.M.	DEGREES.	CENTIMETERS.	P.M.	P.M.	LB.	P.M.	LB.	LB.	LB.
23rd January ..	2	12-20	212	..	1-15	12-45	5	3-20	13	13·0	6·5
24th ,, ..	2¼	2-29	212	..	3-23	2-5	5⅛	5-20	14	13·2	6·2
25th ,, ..	2	2-23	212	..	3-20	2	4¾	4-55	11	11·9	5·2
26th ,, ..	2	1-50	212	..	2-35	1-5	4½	4-20	11½	12·2	5·0
27th ,, ..	3	2-50	218	25	2-45	3	3	4-30	10½	12·3	6·1
29th ,, ..	2	2-40	218	25	2-35	2-45	5	4-13	11½	11·6	6·0
30th ,, ..	2	2-35	218	25	2-30	2-40	3	4-10	10½	11·6	5·2
31st ,, ..	2	2-30	218	25	2-15	2-25	5½	4-17	12	12·5	6·0

It should be noted that, the Madras measure contains 100 cubic inches, an ollock $12\frac{1}{2}$ cubic inches, and a cubic centimeter ·06 cubic inches.

26. The average outturn of jaggery is fairly satisfactory; with a crop of 20,000 lb. per acre, the yield of jaggery would be 1,200 lb., and, besides the jaggery, there would be the refuse cane, and probably, 500 or 600 lb. of grain. The refuse cane and grain, are well suited for feeding stock.

27. Soon after the jaggery was made crystallization began to take place, and such a large proportion became crystallized, it was thought desirable to attempt, by pressure, to squeeze out the molasses; but, the means available were very imperfect. The next table gives the results of these experiments;—

Date when the Jaggery was prepared.	Weight of Jaggery used for the experiment.	Date when used for the experiment.	Pressure first applied.	Pressure applied towards the close of the experiment.	When the experiment ended.	Weight of Crystallized Sugar obtained.	Weight of Molasses.	Per cent. of Crystallized Sugar obtained.	Remarks.
	LB.		LB.	LB.		LB.	LB.		
1. 4th and 7th Feb. 1882.	40	29th June 1882.	56	168	12th Aug. 1882.	35	5	87·5	The jaggery was enclosed in a canvas bag during pressure, the molasses separated with difficulty. The whole formed a sticky mass.
2. 9th and 10th Feb. 1882.	31	Do.	56	168	Do.	$17\frac{3}{4}$	$13\frac{1}{4}$	57·25	A fine gunny cloth bag; the molasses separated fairly well. The sugar on the sides is in large crystals.
3. 9th Feb. 1882 ..	13	Do.	56	168	Do.	7	6	53·8	Common gunny bag; results same as No. 2, but crystals superior.
4. 11th „ „ ..	20	Do.	56	168	Do.	17	3	85	Same as No. 2. Taste is superior.
5. 18th „ „ ..	20	16th Aug. 1882.	56	168	10th Oct. 1882.	$12\frac{1}{2}$	$7\frac{1}{2}$	62·5	The jaggery had been prepared from stripped canes.
6. 23rd „ „ ..	20	Do.	56	168	Do.	$13\frac{1}{4}$	$6\frac{3}{4}$	66·25	Results unsatisfactory; full of large crystals mixed with molasses.
Planters' Friend.									
7. 15th Feb. 1882 ..	20	Do.	56	168	Do.	14	6	70	The jaggery was prepared from the juice of *Sorghum kaffrarium.*

NOTE.—In experiments Nos. 5, 6, and 7 the jaggery before being placed under pressure, was mixed with 5 per cent. of its weight of water.

It was found impossible with the very primitive appliances available, to press out all the molasses of which all the samples contained a considerable percentage; but, this is the difficulty which has not yet been solved in the United States, where, experiments in the manufacture of sugar from the juice of the Sorghum plant, have long engaged the attention of scientific and practical men; but, the United States Government appear determined to solve the problem, for their grant for Sorghum sugar-making investigations, in the official year 1881-82 was 35,000 dollars, and a further appropriation of funds for continuing the experiment, has been sanctioned in the current year. These experiments will, it is hoped, solve some of the difficulties which now present themselves, in connection with the manufacture of sugar from Sorghum juice. The inquiry is a very important one, and steps should be taken in this country, to supplement it, as far as means for this purpose are available.

28. *Thick and Thin Seeding.*—An experiment was made in field No. 15 in thick and thin sowing. Two plots were selected each of one acre in extent, and each was sown with yellow cholum. Plot No. 1 at the rate of 25 lb. per acre, and No. 2 at the rate of 53 lb., per acre. The following statement gives the results;—

Plot.	Area.	Crop.	Date of Sowing.	Amount of Seed used.	Date of Harvest.	Outturn.	
						Grain.	Straw.
			1882	LB.	1883.	LB.	LB.
I	1 acre ..	Yellow Cholum	7th Sept.	25	5th Jan.	214	8,466
II	Do. ..	Do.	Do.	53	6th Jan.	151	11,217

The drought of September was very injurious to the crops, and they never recovered fully from its effects. The yield of grain was greatest on the thinly-sown plot, but the thickly-sown plot gave a much larger yield of straw.

29. A comparative experiment in growing maize and cotton on the "hill" system, and on the "ridge" system, was made in field No. 16. The field was divided into two plots, each measuring about $1\frac{3}{4}$ of an acre. On the eastern plot, the seed was sown on hills, 2 feet apart each way. Two lines of hills were sown with maize, and two lines of hills with cotton-seed alternately, throughout the field. The western plot, was ridged 2 feet apart, and the seed was sown on the ridges, two lines of maize alternately with two lines of cotton, throughout the whole area. The outturn was as below:—

	Cobs.	Straw.
	LB.	LB.
Hill System, East Plot	1,830	7,728
Ridge System, West Plot	1,556	7,294

The cotton crop has not yet been harvested.

30. *The Vitality of Maize stored in different ways.*—As in this country, maize so soon loses it vitality, and usually is so severely attacked by insects in the granary, experiments were made to ascertain whether its vitality would be injuriously influenced by different dressings and admixtures. About the beginning of May, eight kerosine drums were obtained, and each was filled as follows ;—

No. 1.—Ten measures of maize weighing 26 lb. dressed with a mixture of one-eighth ollock of tar and three ollocks of water.
No. 2.— Do. mixed with one-fourth ollock of tar and five ollocks of water.
No. 3.— Do. mixed with 6 lb. of wood-ashes.
No. 4.— Do. mixed with 6 lb. of slaked lime.
No. 5.— Do. mixed with 6 lb. of quicklime.
No. 6.— Do. dressed with 1 oz. of sulphate of copper.
No. 7.— Do. dressed with 2 oz. of sulphate of copper.
No. 8.— Do. without dressings or admixtures.

Each drum was then closed, and made air-tight by the use of pitch and tar. The drums with the seed were placed on a dry shelf in the granary, until the beginning of October, when they were all opened and, a sample was taken from each, and the vitality tested. The results were as follows ;—

No. of Drum.	Vitality of Seed.
	PER CENT.
1	71
2	46
3	50
4	84
5	56
6	60
7	68
8	85

From these results it would appear that the different dressings and admixtures used were injurious to the seed, but, the experiments were not fully carried out, they should have been made in duplicate, and the grain of one series, exposed freely to the attacks of insects. We have yet to ascertain how far the dressings and the admixtures protect grain from the attacks of weevils, &c. It was certainly surprising that maize stored nearly six months in a hermetically-sealed iron vessel should have shown a vitality of 85 per cent. It is difficult to understand the low percentage of vitality of

the grain mixed with wood-ashes, unless the admixture made the seed too dry. Wood-ashes are frequently mixed with seed for storing. All the grain was thoroughly dried before being stored. The experiments will be continued and repeated.

Irrigated Cereal Crops.

31. Irrigated cereal crops were grown on 11·30 acres, of which area 9·81 acres were irrigated from the Mylapore tank. The tank was not filled until late in the season, and became empty before the paddy crops were fully matured. The total yield of grain from 11·30 acres was only 9,198 lb.; and, the yield of straw 30,839 lb., equal to 814 lb. of marketable grain and 2,729 lb. of straw per acre. In the previous year, on the same land, the average outturn per acre was 978 lb. of grain and 4,107 lb. of straw. The crops, for the reasons just noticed, were nearly all planted about two months behind the usual time, and in consequence of this their growth was prolonged beyond the usual harvest time.

32. The outturn of field No. 28 C is remarkable, the field had not been under paddy for several years and, apparently, to this fact chiefly, and the high condition of the soil, must be attributed the largeness of the outturn. The crop in 29 A was injured by floods. Goondoo Sumba paddy usually thrives well on the farm soils, and the grain meets with a ready demand.

33. A piece of land was set apart for a comparative irrigation experiment with Madagascar paddy and ordinary paddy; the former was obtained from a land-owner who had grown it from farm seed; but, it was so mixed with indigenous paddy, the results of the experiment can in no way be considered conclusive. A pure sample of the indigenous seed could not be got at the time. The land was divided in three plots, each containing 120 square yards and, the whole of the plots were planted with seedlings raised from the seed of the so-called Madagascar paddy. A similar piece of land adjoining was also divided into three plots, each of the same area, and they were planted, on the same day, with seedlings raised from Goondoo Sumba seed. The plots in both sets of experiments were similarly tilled and manured. The water used in irrigation was first collected in a cistern before use; in this way the actual quantity of water used was easily determined. The enormous rainfall of November, was far beyond the requirements of the land; there were no means of determining what quantity flowed off the land, but it could not have been less than two-thirds of the total fall. This, of course, lessens the value of the experiment. In the next statement, the results are given.

Number of Field.	Number of Plot.	Description of Crop.	Area of Plot.	Cultivation before Sowing.	Ground-nut Cake Manure applied.		Date of		Quantity of Seedlings.	Irrigation.						Date of Flowering.	Details of Harvesting.					
																			Outturn.			
																					Per Acre.	
					Per Plot.	Per Acre.	Sowing in Nursery.	Transplanting.		How often.	Quantity of Water applied each time.	Total quantity of Water applied.	Equal to Rainfall in Inches.	Actual Rainfall in Inches.	Total quantity of Water-supply in Inches.		Date.	Duration of growth.	Grain.	Straw.	Grain.	Straw.
			SQ. YDS.		LB.	LB.					C. FT.	C. FT.							LB.	LB.	LB.	LB.
		North.																				
35	1	Goondoo Sumba Paddy.	120	Twice ploughed and once levelled.	40	1,613	5th October 1882.	19th November 1882.	Eighteen bundles each of 8" girth.	6 times.	90	540	6·0	34·89	40·89	6th January 1883.	19th March 1883.	165	56	279	2,258	11,253
	2	Do. ..	120		40	1,613			Do.	Do.	180	1,080	12·0	34·89	46·89			165	53	199	2,137	8,026
	3	Do. ..	120		40	1,613			Do.	Do.	270	1,620	18·0	34·89	52·89			165	43½	242½	1,754	9,780
		South.																				
35	1	Madagascar Paddy (mixed).	120		40	1,613			Do.	Do.	90	540	6·0	34·84	40·84			159	33	159	1,331	6,413
	2	Do. ..	120		40	1,613			Do.	Do.	180	1,080	12·0	34·84	46·84			159	46½	205½	1,875	8,288
	3	Do. ..	120		40	1,613			Do.	Do.	270	1,620	18·0	34·84	52·84			159	42	164	1,694	6,614

The outturn of the Goondoo Sumba plots was good, and it is worthy of note that the lightest watering produced the best outturn ; but, as has been noticed, no great importance must be attributed to this, the heavy rainfall having so complicated the experiment. The outturn on the three plots of the so-called Madagascar paddy was fair ; it is difficult to understand why plot No. 1 yielded so much less than the others. These experiments throw but little light on the question of the moderate or lavish use of irrigation water ; such experiments require to be made under arrangements of a very complete nature, so much depends upon the physical state of the soil, peculiarities of the weather, &c. Arrangements are now being made which, it is hoped, will admit of some irrigation experiments being conducted under conditions which can be thoroughly ascertained and, to a considerable extent, controlled. A very general belief is springing up that irrigation water is generally far too lavishly used in South Indian agriculture ; but, up to the present time, no really reliable data have been collected, applicable to ordinary conditions.

34. The Kurnool paddy referred to, is a bearded variety, which has some reputation in the Kurnool district ; it is however, as far as can be judged from the experience of the past unfavorable season, not a prolific variety. In the following statement are recorded the outturn of the irrigated crops harvested.

Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing or Planting.			Details of Harvesting.					Duration of growth.	Rainfall.	
			Date of.	Seed Sown.		Outturn.						Inches.	Wet Days.
				Total.	Per Acre.	Date of.	Grain.	Straw.	Grain per Acre.	Straw per Acre.			
		ACRES.		LB.	LB.		LB.	LB.	LB.	LB.	DAYS.		
1. Goondoo Sumba Paddy	28 C ..	·99	9th Nov. 1882.	Planted.		10th Mar. 1883.	1,980	3,956	2,000	3,996	122	26·56	15
2. Do.	29 A ..	1·18	14th Oct. ,,	50	42·4	8th ,, ,,	558	1,182	473	1,001	145	33·10	23
3. White Car Paddy	30 A ..	·25	25th Nov. ,,	Planted.		5th ,, ,,	150	830	600	3,320	100	9·49	6
4. Do.	37 B ..	·82	18th ,, ,,	Do.		27th ,, ,,	460	1,892	560	2,307	129	19·26	11
5. Do.	37 C ..	·47	18th ,, ,,	Do.		2nd ,, ,,	325	1,371	692	2,917	104	19·26	11
6. Do.	36 B ..	·46	19th Sep. ,,	30	65	28th ,, ,,	295	825	641	1,793	190	36·84	29
7. Do.	36 C ..	·90	19th ,, ,,	34	38	28th ,, ,,	620	1,396	688	1,551	190	36·84	29
8. Do.	37 D ..	·52	18th Nov. ,,	Planted.		6th ,, ,,	420	1,160	807	2,230	108	19·26	11
9. Do.	R. F. 1 & 2	·88	24th Mar. ,,	Do.		3rd June 1882.	1,546	5,100	1,757	5,795	71	·09	1
10. Red Car Paddy	R. F. P. 4.	·39	....	Do.		18th Apr. 1883.	205	485	526	1,243	..	..	..
11. Do.	R. F. P. A.	·22	8th Feb. 1883.	Do.		17th ,, ,,	280	868	1,268	3,945	68	..	..
12. Madagascar Paddy	28 B ..	·40	18th Nov. 1882.	Do.		15th Mar. ,,	280	1,736	700	4,340	117	19·26	11
13. Do.	35 B ..	·61	4th Oct. ,,	50	82	20th ,, ,,	410	2,110	672	3,459	167	34·89	27
14. Do.	37 A ..	·62	18th ,, ,,	Planted.		27th ,, ,,	428	1,708	690	2,755	159	33·45	21
15. Carolina Paddy	35·7 ..	·04	18th Nov. ,,	Do.		2nd ,, ,,	25	136	625	3,400	104	19·26	11
16. Kurnool Paddy	29 B ..	·40	28th Oct. ,,	30	75	5th ,, ..	168	1,472	420	2,453	128	36·57	18
17. Do.	30 A ..	1·55	7th ,, ,,	89	57	22nd Feb. 1883.	800	3,240	516	2,090	138	34·84	26
18. Sixty days' Sumba Paddy	29 A ..	·60	16th Dec. ,,	150	250	7th Mar. ,,	248	1,372	413	2,287	81	..	..

Industrial and other Crops.

34*a*. The area under these crops was 35·31 acres, of which 30·41 acres were standing at the commencement of the year. Of the crops sown in the year, 4·54 acres were left standing, the yield of which will be recorded in the next annual report.

35. The following statement shows the results of those crops harvested during the year:—

Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing. Date of.	Seed sown. Total.	Seed sown. Per Acre.	Details of Harvesting. Date.	Outturn. Per Plot.	Outturn. Per Acre.
		ACRES.		LB.	LB.		LB.	LB.
							Cotton-in-seed.	
1. Cotton	10	1·00	Previous year.	9	9	5th July 1882.	353	353
2. Do.	11 East ..	1·48	13th Sept. 1881.	10	7	1st Sept. „	811·25	548
3. Do.	11 West ..	1·48	13th „ „	10	7	1st „ „	613·75	415
4. Do.	15 East ..	4·17	15th „ „	30	7	3rd Aug. „	1,061	254
5. Do.	15 West ..	1·06	23rd „ „	30	28	14th July „	353·75	334
6. Do.	31	2·13	8th „ „	15	7	1st Sept. „	178·25	84
7. Do.	32	4·76	3rd „ „	50	10	4th Aug. „	475·75	100
8. Do.	33	3·54	6th „ „	35	10	17th „ „	531·50	150
							Seed.	
9. Indigo	10 B. West ..	2·15	18th „ 1882.	20	9	3rd Feb. 1883.	415·0	193
10. Do.	19	3·00	24th Oct. 1881.	37	12	1st May „	618·0	206
11. Do.	33 East ..	2·39	14th „ 1882.	25	10	12th Jan. „	263·5	110
12. Do.	34 B. ..	·77	27th Dec. 1881.	9	12	29th Sept. 1882.	155·5	202
13. Do.	35 D. ..	·35	27th „ „	4	11	29th „ „	73·5	210
14. Castor Beans ..	16	1·15	23rd Nov. „	8	7	17th April „	165·5	144
15. Do.	20	1·48	26th „ „	30	20	27th „ „	157	106
16. Arrowroot	{ B. G .. D. 4 .. .. }	·01	8th July 1882.	Transplanted		7th Feb. 1883.	150	1,270·5
							Bunches.	
17. Plantains	4 B. II ..	·26	6th June 1879.	Planted during the year.			90	346
18. Do.	35 A. 1, 2 & 3.	1·49	6th Sept. 1881.	Do. do.			79	53
19. Do.	12 C. ..	·55	26th Dec. 1878.	Do. do.			54	98
							lb.	lb.
20. Chillies	12 A., B. & D.	1·74	30th Jan. 1882.	Planted.		2nd Sept. 1882.	3,764	2,163

The outturn of cotton-in-seed from 19·62 acres was 4,378 lb. equal to 223 lb. per acre or about 75 lb. of clean lint. The outturn is low; but, it must be remembered, the whole of the land under cotton, produced also either a crop of maize, or one of Sorghum between the lines of cotton plants. In considering these results, the character of the season, and of the farm soils, should be fully remembered. The cotton, which was all of the New Orleans variety, was sold on the farm for Rs. 318-10-1, which is Rs. 120 per candy of 500 lb.

36. The cotton in field No. 10 was sown in September 1881, it was therefore in the second year. The yield of this crop was 353 lb. of cotton-in-the-seed or, about 118 lb. of clean lint per acre, which, was a fair return, under the circumstances; but, generally it pays better to keep the cotton plants standing only one year; as, from the open shade of the plant, the growth of weeds is encouraged and, from the branching habit of growth of the cotton plant, weeding cannot be done by cattle labor, and is therefore expensive.

37. *Irrigated Cotton.*—A portion of field No. 11, sown with cotton, which measured 2·96 acres, was divided into two portions of equal area, and one plot was occasionally irrigated. The next statement affords full information regarding the results:—

Plot.	Area.	How often Watered.	Quantity of Water applied.	Equal to Rainfall.	Actual Rainfall.	Total Amount of Water.
1	2	3	4	5	6	7
	ACRES.		C. FT.	INCHES.	INCHES.	INCHES.
Irrigated	1·48	14 times.	36,120	6·72	37·92	44·64
Unirrigated	1·48	*Nil.*	*Nil.*	*Nil.*	37·92	37 92

Plot.	Outturn Cotton-in-Seed.		Obtained by Ginning. Per Plot. Cotton Lint.	Per Plot. Seed.	Per Acre. Cotton Lint.	Per Acre. Seed.	Percentage of Lint in Cotton-in-Seed.
	8		9	10	11	12	13
	PER PLOT.	PER ACRE.	LB.	LB.	LB.	LB.	LB.
Irrigated	811·25	548·14	229·05	523·50	154·76	353·71	28·23
Unirrigated	613·75	414·69	193·25	423·25	130·57	285·09	31·48

38. The statements that follow show the percentage outturn of lint, and other information, regarding the cotton crops of the last season :—

Months.	Field No. 10. Cotton-in-Seed.	Field No. 10. Lint.	Field No. 10. Percentage of Lint.	Field No. 11, Irrigated. Cotton-in-Seed.	Field No. 11, Irrigated. Lint.	Field No. 11, Irrigated. Percentage of Lint.	Field No. 11, Unirrigated. Cotton-in-Seed.	Field No. 11, Unirrigated. Lint.	Field No. 11, Unirrigated. Percentage of Lint.	Field No. 15, East. Cotton-in-Seed.	Field No. 15, East. Lint.	Field No. 15, East. Percentage of Lint.
1	2	3	4	5	6	7	8	9	10	11	12	13
1882.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.
March	107	29·25	27·3	98·50	28·14	28·50	62·75	18	28·7	350	104·5	29·8
April	121	32	26·4	160·75	51·35	31·94	169·25	55	32·5	157·25	48·5	30·8
May	18	6·20	34·4	86·00	23·25	27·03	128·50	38·25	29·8	250·75	76·5	30·8
June	83	27·50	33·1	167·50	49·00	29·50	131·25	42·5	31·9	117	40	34·2
July	24	7·50	31·25	180·50	52·80	29·50	58·00	17·50	30·2	130	41·5	31·5
August	..	..	..	118·00	33·00	27·96	64·00	19·25	30·0	56	16·5	28·6
September ..	..	..	..	..	..	..	..	..	..	..	..	..
October	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	353	102·45	..	811·25	237·54	..	613·75	190·50	..	1,061·0	327·5	..
Average per Acre ..	353	102·45	29·0	548·1	160·5	29·2	414·6	128·7	31·0	254·4	78·5	30·8

Months.	Field No. 15, West. Cotton-in-Seed.	Field No. 15, West. Lint.	Field No. 15, West. Percentage of Lint.	Field No. 31. Cotton-in-Seed.	Field No. 31. Lint.	Field No. 31. Percentage of Lint.	Field No. 32. Cotton-in-Seed.	Field No. 32. Lint.	Field No. 32. Percentage of Lint.	Field No. 33. Cotton-in-Seed.	Field No. 33. Lint.	Field No. 33. Percentage of Lint.
	14	15	16	17	18	19	20	21	22	23	24	25
1882.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.
March	84·75	24·75	29·2	62·50	18·85	30·1	230·25	73·25	31·8	222·5	68·40	30·7
April	161·50	49·00	30·3	4·25	1·25	29·4	91·50	29·50	32·2	122·0	37·00	30·3
May	27·50	7·25	26·3	32·50	9·25	28·4	34·00	9·50	27·9	51·0	13·50	26·4
June	39·00	14·00	35·9	31	8·5	25·9	60·00	18·25	30·4	54·0	19·25	35·6
July	41·00	11·50	28·0	8	2	25·0	40·00	11·25	28·1	32·0	10·25	32·0
August	..	..	..	40	12·5	30·1	20·00	6·50	32·5	50·0	15·50	31·0
September ..	..	..	..	..	..	..	..	..	..	..	..	..
October ..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	353·75	106·50	..	178·25	52·35	..	475·75	148·25	..	531·5	163·9	..
Average per Acre ..	333·7	100·4	30·1	83·6	24·5	29·3	99·9	31·1	31·1	150·1	46·3	30·8

Description of Crop.	Number of Field and Plot.	Area.	Cost of preparation of Land.	Cost of Seed and Sowing.	Cost of After-cultivation.	Cost of Harvesting and securing Produce.
1	2	3	4	5	6	7
		ACRES.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Maize and Cotton	11 ..	2·96	26 0 3	13 10 0	49 1 11	18 4 0
Do.	15 A ..	4·17	25 3 0	11 4 1	29 5 5	20 12 6
Do.	15 B ..	1·06	19 8 0	12 6 2	36 6 5	9 13 3
Planters' Friend and Cotton	31 ..	2·13	13 14 0	4 9 0	7 11 6	11 2 6
Ragi and Cotton	32 ..	4·76	6 10 0	11 8 0	20 12 0	8 4 6
Sorghum and Cotton	33 ..	3·54	16 6 6	6 5 0	14 11 0	18 2 6

Description of Crop.	Value of Manure applied.	Total Expenditure on Crop.	Value of unexhausted Manure carried forward.	Net Cost of Crop.	Value of Produce.	Remarks.
	8	9	10	11	12	13
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	
Maize and Cotton	45 2 0	159 0 2	13 6 0	145 10 2	234 6 8	
Do.	72 9 0	159 2 0	20 15 0	138 3 0	268 1 3	
Do.	65 13 0	*143 14 10	15 12 0	128 3 4	43 9 2	Failed from land having become flooded.
Planters' Friend and Cotton ..	33 5 0	70 10 0	6 10 0	60 0 0	57 15 7	
Ragi and Cotton	43 1 0	90 3 9	14 5 0	75 14 9	102 10 7	
Sorghum and Cotton	33 15 0	89 8 0	8 12 0	80 12 0	158 1 10	

39. *Yca Valley Cotton.*—Nearly an acre of land is under this crop, the plants are growing luxuriantly, and, so far, have not been attacked by the borer from which this variety of cotton suffered so severely, in former experiments. The lint is, apparently, quite as long and good, as that produced when the seed was first obtained from South America. The seed is being collected, and preserved with care for sowing. The lint is superior to Sea Island or, any other variety of cotton that has been tried at Saidápet.

40. *Nankin Cotton.*—Attention has been directed to this cotton since the adoption in the Army of brown-colored cotton uniforms in lieu of white. The natural dun-colored lint produces a fabric of a much more permanent and uniform a color, than hitherto has been obtained by dyeing ordinary cotton cloth. The Nankin cotton plant has long been known in this Presidency; but it is a small producer of lint, and is not in favor with cultivators. There is an impression that it crosses very readily with other kinds of cotton, and that as these mostly produce white lint, there will be a want of uniformity in the color of the lint. This is, of course, possible ; but, on the farm so far, there is no evidence to show that the color of the Nankin cotton produced has, in any way, suffered from this cause. It is indeed remarkable how seldom there is any evidence of interbreeding between the different varieties of cotton grown on the farm. New Orleans, Yca Valley and Brazil cotton have been grown for some years in the Botanical Gardens in close proximity, and there is not a particle of evidence to show that these varieties have interbred.

41. *Indigo.*—The indigo crops were grown chiefly for the production of seed, the variety being a gigantic one, growing to a height of 5 or 6 feet, obtained from Agra.

42. *Castor-oil.*—No regular crops were grown, the seed was sown simply to raise shade plants amongst young casuarinas.

43. *Arrowroot.*—A small plot measuring 80 square yards was cropped with arrowroot. It yielded 150 lb. of tubers ; of these, 100 lb. were used in making flour, of which the outturn was 14 lb. Had flour been made from the whole of the tubers,

* The land was twice or thrice sown.

the yield per acre would represent 1,270 lb. The old flour on hand when the last report was prepared was sold by auction at $1\frac{1}{2}$ annas per pound.

44. *Colocasia Antiquorum.*—The so-called country potato known in Tamil as Shamakilanghoo yielded on a plot of 80 square yards 52 lb. of tubers, which was at the rate of 3,146 lb. per acre. Both tubers and leaves are used as human food.

45. *Typhonium Orixense.*—The Tellinga potato yielded on a plot of 80 square yards 53 lb. of tubers, equal to 3,206 lb. per acre. The tubers are used as vegetables and also, for medicinal purposes.

46. *Manilla Hemp* (*Musa Textilis*).—This crop is now quite acclimatised on the farm, and does not require any attention beyond that given to the common plantain; indeed, from the appearance of the plants it would seem that they require less water than the common plantain. The stems of some of the plants are of remarkable thickness, and of great height compared with those of the common plantain. Numerous experiments have been made to extract the fibre, but the cost of production generally compared unfavorably with the value of the clean fibre.

47. The following are some of the results obtained.

Date of Experiment.	Number of Stems.	Portion of Stem used.	Length of Stem.		Circumference of Stem.		Weight of Stem.	Weight of Pith.	Weight of portion of Stem used for experiment.	Weight of Fibre obtained.	Details of Operations. Time occupied				Cost of Operation.			Cost of preparing the Fibre per Pound.			Remarks.
											For Crushing.	For Steeping.	For Washing.	For Beating.							
		Manilla Hemp.	FT.	IN.	FT.	IN.	LB.	LB.	LB.	OZ.	MINS.	HOURS.	MINS.	MINS.	RS.	A.	P.	RS.	A.	P.	
7th June 1882 ..	1	Outer layer	6	9	0	19	34	9	25	4⅛	13	..	10	45	0	1	0	0	3	10	Crushed, washed and beaten at once.
17th ,, ,, ..	..	Inner layer	..		..		..	..	..	3½	9	..	10	40	0	0	6	0	2	3½	Do. do.
17th ,, ,, ..	2	Outer layer	6	10	0	20	35	8½	26½	3	12	3	..	55	0	1	6	0	8	0	Steeped for three hours and then crushed.
17th ,, ,, ..	..	Inner layer	..		..		..	..	..	3½	11	3	..	52	0	1	0	0	4	3½	Do. do.
20th ,, ,, ..	1	Outer layer	6	2	2	1	55	6½	48½	7	18	..	10	40	0	0	6	0	1	1½	With flower stalk, crushed and beaten.
20th ,, ,, ..	..	Inner layer	..		..		..	..	..	13½	12	..	8	30	0	0	4	0	0	4¾	Do. do.
20th ,, ,, ..	2	Outer layer	8	0	2	10	128	17¾	110¼	16½	35	3	15	60	0	0	11	0	0	10⅔	Without flower, crushed, steeped three hours and beaten.
20th ,, ,, ..	..	Inner layer	..		..		..	..	..	16½	25	3	12	48	0	0	8½	0	0	8¼	Do. do.
20th ,, ,, ..	3	Outer layer	9	0	2	5	105	16	89	12¼	28	..	15	55	0	0	10½	0	1	1¾	Without flower, crushed and beaten.
20th ,, ,, ..	..	Inner layer	..		..		..	..	..	16¼	18	..	11	48	0	0	8	0	0	7½	Do. do.

48. For comparison, the following statement is added, giving results of experiments made in extracting the fibre of the common plantain;—

Date of Experiment.	Number of Stems.	Portion of Stem used.	Length of Stem.	Circumference of Stem.	Weight of Stem.	Weight of Pith.	Weight of portion of Stem used for experiment.	Weight of Fibre obtained.	Details of Operations. Time occupied For Crushing.	For Steeping.	For Washing.	For Beating.	Cost of Operation.	Cost of preparing the Fibre per Pound.	Remarks.
		Common Plantain.	FT. IN.	INCHES.	LB.	LB.	LB.	OZ.	MINS.	HOURS.	MINS.	MINS.	RS. A. P.	RS. A. P.	
16th June 1882	1	Outer layer	5 0	21	32	7½	24½	3	10	3	15	50	0 1 0	0 5 4	Steeped and then beaten.
Do.	1	Inner layer	5 0	..	..	..	..	3⅝	..	3	12	40	0 0 8	0 2 11	Do. do.
Do.	2	Outer layer	5 2	19	30	4¼	25¾	7¼	12	3	10	..	0 0 9	0 1 7	Steeped for three hours and then crushed.
Do.	2	Inner layer	5 2	..	..	..	..	8¼	..	3	8	..	0 0 6	0 0 11	Do. do.
Do.	3	Outer layer	5 0	15	20	3	17	3¼	11	1	..	..	0 1 6	0 7 4	Boiled for one hour after crushing.
Do.	3	Inner layer	5 0	..	..	..	..	3½	..	½	..	..	0 1 0	0 4 9	Boiled for half an hour after crushing.

49. A roughly-made stem-crusher was used in the experiments; it consists of a pair of wooden rollers about one foot long and four inches in diameter, fixed in uprights, and worked by a handle. Two men were needed to work the machine, and two to feed and remove the fibre, &c. A mill on the principle of the Beheea Sugar Mill, with wooden instead of iron rollers would, it is believed, do good work. The machine used in these experiments was without cogs for driving, or the means of adjustment. With the aid of proper apparatus a roughly-prepared fibre for rope-making might be turned out at a sufficiently low cost. The ordinary selling price of Manilla Hemp rope in Madras is 5 annas per pound.

50. The least costly way of separating the fibre was found to be, to steep the sheaths in water after crushing, and to remove the remainder of the pulp after slight fermentation by washing; but the fibre was of a bad color, and fitted only for rope-making. Up to the present time the fruit of the plant has not been utilized in any way; it contains a great number of large seeds and the pulp is insipid and rather unpleasant to the taste. Possibly by separating the pulp from the seed, and converting the former into starch, something could be done towards utilizing the fruit.

51. Several applications for shoots we received, and they have been met as far as possible. The following statement shows the number of shoots distributed:—

Place.	No. of Shoots.
Madras	18
Central Provinces	50
South Arcot	20
South Canara	4
Nílgiris	3
Total ...	95

At the close of the year the plot consisted of the undermentioned plants:—

Full-grown	23
Half-grown	323
Shoots fit for planting	182
Total ...	528

The plot will be extended as shoots become available for the purpose.

52. *Chillies.*—This crop was cultivated on a somewhat larger scale than usual. The crop in field (12) was a very fine one, the fruits were much larger than are usually seen, although only ordinary seed was used. About two months after planting flowers appeared, and the production of fruit continued until the crop was taken up. Numerous plants had as many as forty fruits at one time, besides being profusely covered with flower. The produce was at the rate of 2,163 lb. of chillies per acre. As the field had to be sown with cotton and maize in September, the chillie crop was taken up when still bearing heavily. There is not much difficulty in producing chillies, if the crop is well watered during its early growth and is kept free of weeds. The fruit can be readily sold either fresh or dry. The condition of the soil, and the kind of manure used, influences greatly the value of the crop. A somewhat stiff soil and strong manure, such as blood-compost, specially suit the crop.

53. *Casuarina Trees* (*Casuarina Muricata*).—The various experimental plantations of these trees continue to thrive. The year was not a favorable one for tree-planting operations, where irrigation water was not available. On one plot, in field 17 which was planted in February last, the trees have grown in a very remarkable way; when they were planted they were only about one foot in height, and they have since grown on the average about six inches per month, the soil is a very coarse sand, and is in a low manural condition, but it was kept open by the frequent use of the plough while the watering was regular and sufficient. The trees were planted four feet apart in the rows and six feet apart between the rows. This distance appears to be that best suited for casuarina trees on the sandy soils of the farm. During the year, the area planted was 8 acres; all the land was sandy and poor. There are now on the estate about

39 acres under casuarinas, in different stages of growth. Not only will the land thus occupied yield a handsome return in a few years, but the land itself is gradually being improved, from the large addition of organic matter from the fallen leaves of the trees. The fall of leaves during a year is very considerable ; in a casuarina plantation aged four years, the weight of decaying leaves covering the ground was found to be as follows ;—

	Area.	Weight, shed leaves.
	SQ. YDS.	LB.
Plot 1	54	34·5
,, 2	54	38·5
,, 3	54	39·0
,, 4	54	44·5

The average of these results shows that the land has a covering of leaves distributed, at the rate of about 1½ tons per acre. Below the covering of fallen leaves lies a thin strata of black vegetable mould, the remains of previous sheddings of leaves. There cannot be a doubt but that the sandy soils of the farm will benefit very greatly by being planted with casuarinas, the one great defect in these soils being their poverty in organic matter.

54. *Cocoanut Trees.*—A number of cocoanut trees which were planted about eight years ago, came into bearing this year ; some of them yielded heavily. A number of cocoanut trees were planted in some salt land where ordinary crops did not thrive ; and, as far as can be judged now, these cocoanuts are doing as well as could be desired. Large pits were made and filled with coarse sand before the plants were put in. In another field cocoanuts were planted along with plantains, the intention being that the latter should afford shade, and in a measure utilize the ground during the first two years, while the cocoanut trees are small. Planting the portions of the Farm estate, unfitted for agricultural use with fruit and fuel trees will greatly add to the value of the property ; though, there will be, on this account, an outlay on labor for which for some time there will be no corresponding return.

55. (*Atriplex Nummularia*) *Salt-bush.*—Attention has been directed to this shrub as one adapted for cultivation on land containing too large a percentage of salt for the favorable growth of ordinary crops. The salt-bush is highly appreciated in certain parts of Australia where cattle and sheep are fond of brousing on its leaves and twigs. A small supply of seed was obtained from the Botanical Gardens, Saharanpur, and arrangements have been made for procuring a further supply direct from Australia.

56. *Divi Divi.*—There were on the farm at the beginning of the year sixteen bushes planted in 1879. They yielded 13 lb. of pods at the end of March 1882 and again in March last bore another crop of 60 lb. of pods which yielded 4½ lb. of seeds. From the first crop a number of seedlings have been raised and planted out in different places over the estate, and there are at present six hundred young seedlings ready for planting out on the first favorable opportunity. It is proposed to plant these by themselves to form an experimental plantation.

57. *Eucalyptus.*—The Eucalyptus trees planted out about three years ago, continue to thrive, and there are at present 296 seedlings from recently imported seed, ready for planting out, of the following kinds :—

Eucalyptus	Hemipoya.	Eucalyptus	Hemipoya.
Do.	Paniculata.	Do.	Rostiata.
Do.	Teriticormis.	Do.	Rosinifera.
Do.	Citriodosa.	Do.	Bicolor.
Do.	Lidrophlio.		

There seems to be now every prospect of eight varieties at least of Eucalypti being naturalized at Saidápet, for the trees are not likely trees to encounter a much worse season than the past has been. The measurements of the various specimen trees were given under paragraph 74 of the last report.

Manures.

58. Oil-cake was largely used on the farm last year, of the following varieties:—

White Castor Cake.	Gingelly Cake.
Bassia Cake.	Ground-nut Cake.

The total weight amounted to upwards of 80 candies of 500 lb. average. The prices paid were, delivered at the farm, as follows:—

		RS.	A.	P.
White Castor Cake, per Candy	... ...	6	8	0
Bassia Cake do.	... ...	3	8	0
Gingelly Cake do.	... ...	5	4	0
Ground-nut Cake do.	... ...	5	0	0

59. The undermentioned analyses show the usual average composition of these cakes:—

—	White Castor Cake.	Bassia Cake.	Gingelly Cake.	Ground-nut Cake.
	PER CENT.	PER CENT.	PER CENT.	PER CENT.
Moisture	10·19	13·54	9·78	8·10
Oil	11·57	}	7·50	8·76
(*a*) Albuminoids	48·62	} 80·79	30·37	30·50
Digestible fibre	11·56	}	27·12	27·78
Cellulose (woody fibre)	8·16	}	12·21	19·12
(*b*) Mineral matters (ash)	9·90	5·67	13·02	5·74
Total ...	100·00	100·00	100·00	100·00
(*a*) Containing nitrogen	7·78	2·73	4·86	4·88
(*b*) Containing sand	2·07	...	4·41	...
Soluble portions of ash	7·83	...	...	...

The white castor cake had been made from decorticated seed, and was in the form of a powder very convenient for distribution. Seeing that it contained nearly 8 per cent. of nitrogen, it is a very valuable manural agent. Bassia cake contains only about one-third the quantity of nitrogen that white castor cake contains; it is however procurable in some places at a low cost, and may there be used with advantage. Gingelly and ground-nut cake are valuable feeding cakes and, as a rule, it pays the farmer much better to use these cakes in feeding his stock, and to fertilize his land with the manure of the stock so fed, rather than to manure the land directly with these cakes; but, cake of these varieties is occasionally met with, in a condition unfitted for use as cattle food, and such, when the price is sufficiently low may, with advantage, be used as manure. The bassia, gingelly and ground-nut oil cakes are usually in blocks each from ½ lb. to 5 or 6 lb. in weight, these pieces must be broken and pulverized before the cake can be used as manure, and this increases its cost. In addition to oil-cake, farm manure, wood ashes, and the other ordinary manures, were made use of.

60. *Salt.*—Common salt was employed with considerable advantage in arresting the attacks of white-ants on cocoanut trees, and as manure for these trees. The quantity applied varied from 1 to 5 lb. according to the age of the tree. The usual price of salt, however, is too high to admit of its general use in agriculture. As will be noticed elsewhere (cattle), there is no good reason why specially-prepared common salt should not be available, duty free, to the agriculturists of this country.

61. *Green Manure.*—The arable land was as far as possible sown with horse-gram after the removal of the ordinary crops, and the gram crop was grazed, cut for fodder, or ploughed-in, as circumstances necessitated. There cannot be a doubt but that the nitrogen that accumulates in the soil during the long dry season is, in this way, conserved, and protected from waste, when the heavy monsoon-rains set in.

62. The experiment in Field No. 8 which was commenced in 1880 (*vide* paragraph 90 of the last report) was continued. The crop, yellow cholum (*Sorghum vulgare*), was sown on the 14th of September. The seed was dressed in the usual way, it germinated well, and produced a fair covering of plants; but the crop, like others growing at the time, suffered severely from unseasonable weather. The outturn from the eight experimental plots was 440·25 lb. of grain and 3,203 lb. of straw, which is equal to 550 lb. of grain and 4,004 lb. of straw per acre. In the previous year the outturn was 770 lb. of grain and 7,490 lb. of straw per acre. It will be observed that no manure was used in the past season. The limed plot again gave a small yield. The ash-manured plot has, contrary to all experience, yielded almost as good results in the third year as farm-yard manure; however, the value of its total outturn in the three years is still considerably below that of the plot manured with farm manure. It is proposed to continue the experiments longer without manure, and further experience may throw light upon the apparent contradictions which now present themselves; but instead of cholum, which is so readily attacked by "rust" on the sandy soils of the farm, it is proposed to substitute ragi, which is better suited to such soils. The next statement gives the results for the three years over which the experiment has extended.

Plot.	FIRST YEAR (1880-81). Crop—*Sorghum Vulgare.* Manure used on each Plot.	Outturn. Per Plot. Grain.	Straw.	Per Acre. Grain.	Straw.	SECOND YEAR (1881-82). Crop—*Sorghum Saccharatum.* Manure used on each Plot.	Outturn. Per Plot. Grain.	Straw.	Per Acre. Grain.	Straw.	THIRD YEAR (1882-83). Crop—*Sorghum Vulgare.* Manure used on each Plot.	Outturn. Per Plot. Grain.	Straw.	Per Acre. Grain.	Straw.	Total Outturn of each Plot per Acre in the 3 years over which the experiments have extended. Grain.	Straw.	Value of Produce per Acre. Grain.	Straw.	Total.
		LB.	LB.	LB.	LB.		LB.	LB.	LB.	LB.		LB.	LB.	LB.	LB.	LB.	LB.	RS.	RS.	RS.
3	1 ton farm manure	95	531	950	5,310	No manure	60	840	600	8,400	No manure was used.	66	466	660	4,660	2,210	18,370	44·2	61·2	105·4
4	No manure	54	291	545	2,915	10 cwts. farm manure ..	99	672	990	6,720		55	454	550	4,540	2,085	14,175	41·7	47·2	88·9
5	2,860 lb. ashes	51	238	515	2,385	No manure	84	840	840	8,400		65	458	650	4,580	2,005	15,365	40·1	51·2	91·3
6	No manure	57	281	570	2,810	66½ lb. oil-cake	75	840	750	8,400		66	421	660	4,210	1,980	15,420	39·6	51·4	91·0
7	211 lb. slaked lime	48	210	485	2,100	No manure	61	728	610	7,280		48	328	480	3,280	1,575	12,660	31·5	42·2	73·7
8	No manure	47	218	475	2,185	1 ton farm manure	99	896	990	8,960		53	370	530	3,700	1,995	14,845	39·9	49·4	89·3
9	50 lb. oil-cake	84	361	845	3,615	No manure	80	616	800	6,160		50·2	342	502·5	3,420	2,147·5	13,195	42·9	44·0	86·9
10	No manure	34	191	345	1,915	Do.	58	560	580	5,600		37	364	370	3,640	1,295	11,155	25·9	37·1	63·0
	Average yield ..	59	290	591	2,904	Average yield ..	77	749	770	7,490	Average yield ..	55	400	550	4,004					

63. The "ash and cattle-dung experiments" referred to at paragraph 94 of the last year's report were also continued. The bad season nearly put an end to this experiment. The soil contains upwards of 92 per cent. of sand, and the drought of October ruined the crop. The results are recorded merely to continue the history of the experiment, otherwise they do not, as far as can now be judged, possess any value. The widely-varying results obtained in each year show the necessity for experiments such as these being continued over several years, before definite conclusions are drawn; at the same time it must be remembered that from the sandy nature of the soils of the farm, its crops are exceptionally liable to damage in an adverse season. It is proposed in this experiment also to substitute ragi (*Eleusine corocana*) for sorghum as being better suited to the soil:—

Description of Manure.	Number of Hours during which the Cattle were tied up.	Weight of each Pair of Bullocks.	Box Manure.		Solid Excrements.		Ash of Cattle-dung.		Food of the Animals.		
			Straw used for Bedding.	Weight of Box Manure obtained.	Weight of the fresh solid Excrements.	Solid Excrements finally available.	Indigo Husk used for Bratties.	Weight of Ashes obtained.	Cake.	Green Food.	Straw.
1880-81.											
	HOURS.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.
A. Box manure ..	1,051	1,126	545	1,716	..	..	..	..	182	2,275	2,275
B. Solid excrements.	1,049	1,135	..	..	2,171	784	..	..	182	2,275	2,275
C. Ashes	1,051	1,115	..	..	2,288	..	90	240	182	2,275	2,275
1881-82.											
A. Box manure ..	1,209	1,219	185	1,848	..	..	..	..	320	2,731	1,335
B. Solid excrements.	1,195	1,281	..	..	1,653	676	..	..	320	2,931	1,335
C. Ashes	1,200	1,252	..	..	1,636	..	56	171	320	2,831	1,335
1882-83.											
A. Box manure ..	1,467·5	1,271	125	2,314	..	..	..	..	433	32	1,983
B. Solid excrements.	1,334	1,232	..	..	1,405·7	491	..	..	433	30	1,835
C. Ashes	1,348·2	1,207	..	..	1,429·2	..	Husk. 27·5	Ashes. 119	433	32	1,890

Average Outturn of Manure from one Pair of Cattle during ninety-three Days.

	LB.
In Box manure	2,314
Solid excrements	1,405·7
Ashes	119

The next statement gives the crop return for the past three years.

1880-81.

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	
Manure	Manure—856 lb. box manure.	Manure—None.	Manure—392 lb. solid excrements.	Manure—None.	Manure—120 lb. dung ashes.	
Produce: Grain	25 lb.	$14\frac{1}{2}$ lb.	$28\frac{1}{4}$ lb.	$15\frac{3}{4}$ lb.	$18\frac{3}{4}$ lb.	
Produce: Straw	189 ,,	125 ,,	193 ,,	168 ,,	201 ,,	

	Plot 12.	Plot 11.	Plot 10.	Plot 9.	Plot 8.	Plot 7.
Manure	Manure—856 lb. box manure.	Manure—None.	Manure—392 lb. solid excrements.	Manure—None.	Manure—120 lb. dung ashes.	Manure—None.
Produce: Grain	$24\frac{3}{4}$ lb.	19 lb.	$28\frac{1}{2}$ lb.	$14\frac{1}{4}$ lb.	$23\frac{1}{2}$ lb.	$12\frac{1}{2}$ lb.
Produce: Straw	172 ,,	149 ,,	196 ,,	170 ,,	198 ,,	177 ,,

1881-82.

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.
Manure	Manure—924 lb. box manure and 9 lb. husk ashes.	Manure—None.	Manure—338 lb. solid excrements and 9 lb. husk ashes.	Manure—$92\frac{1}{2}$ lb. paddy straw and 9 lb. husk ashes.	Manure—$82\frac{1}{2}$ lb. bratty ashes.	Manure—None.
Produce: Grain	12 lb.	3 lb.	$6\frac{1}{2}$ lb.	$10\frac{1}{2}$ lb.	9 lb.	$5\frac{1}{3}$ lb.
Produce: Straw	201 ,,	75 ,,	125 ,,	136 ,,	136 ,,	110 ,,

	Plot 12.	Plot 11.	Plot 10.	Plot 9.	Plot 8.	Plot 7.
Manure	Manure—924 lb. box manure and 9 lb. husk ashes.	Manure—None.	Manure—338 lb. solid excrements and 9 lb. husk ashes.	Manure—None.	Manure—$85\frac{1}{2}$ lb. bratty ashes.	Manure—$92\frac{1}{2}$ lb. paddy straw and 9 lb. husk ashes.
Produce: Grain	6 lb.	$5\frac{1}{2}$ lb.	$6\frac{1}{2}$ lb.	9 lb.	$9\frac{1}{2}$ lb.	$9\frac{1}{2}$ lb.
Produce: Straw	139 ,,	119 ,,	143 ,,	164 ,,	189 ,,	168 ,,

1882-83.

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.
Manure	Manure—1,157 lb. box manure and $1\frac{1}{4}$ lb. husk ashes.	Manure—None.	Manure—$245\frac{1}{2}$ lb. solid excrements and $1\frac{1}{4}$ lb. husk.	Manure—$62\frac{1}{2}$ lb. paddy straw and $1\frac{1}{4}$ lb. husk ashes stored.	Manure—$59\frac{1}{2}$ lb. bratty ashes.	Manure—None.
Produce: Grain	6 lb.	3 lb.	8 lb.	6 lb.	4 lb.	$5\frac{1}{2}$ lb.
Produce: Straw	254 ,,	72 ,,	164 ,,	104 ,,	80 ,,	120 ,,

	Plot 12.	Plot 11.	Plot 10.	Plot 9.	Plot 8.	Plot 7.
Manure	Manure—1,157 lb. box manure and $1\frac{1}{4}$ lb. husk ashes.	Manure—None.	Manure—$245\frac{1}{2}$ lb. solid dung and $1\frac{1}{4}$ lb. husk ashes.	Manure—None.	Manure—$59\frac{1}{2}$ lb. bratty ashes.	Manure—$62\frac{1}{2}$ lb. paddy straw and $1\frac{1}{4}$ lb. husk ashes.
Produce: Grain	5 lb.	6 lb.	6 lb.	$7\frac{3}{4}$ lb.	$8\frac{1}{2}$ lb.	6 lb.
Produce: Straw	204 ,,	100 ,,	160 ,,	124 ,,	152 ,,	156 ,,

64. The following statement regarding the manufacture of farm-manure affords some useful information :—

Cattle Number of the Boxes.	Cattle.	Number of Animals.	Area of Boxes.	Days accumulating.	Actual Hours.	Date when weighed.	Weight of Manure.	Condition of Manure.
			SQ. FT.	DAYS.			LB.	
1	Nellore	2	84	78	In working days—13 hours. In holidays—16 hours.	5th December 1882 ..	9,200	Well decomposed.
2	Mysore	2	84	79		5th, 6th December 1882..	6,300	Do.
3	Nellore and Aden ..	2	84	80		6th, 7th ,, ,, ..	7,000	Do.
4	Mysore	2	84	58		15th November 1882 ..	6,850	Not well decomposed.
5	Do.	2	84	84		11th December ,, ..	6,630	Tolerably good.
6	Aden	2	84	81		8th ,, ,, ..	4,900	Well decomposed.
7	Mysore	2	84	53		9th, 10th November 1882.	7,040	Tolerably good state.
8	Half-bred young bullocks	2	84	96		23rd December 1882 ..	5,620	Well decomposed.
9	Punganúr and Aden.	2	84	96		23rd ,, ,, ..	6,050	Do.
10	Aden	2	84	65		15th, 22nd November 1882.	5,140	Not so good.
11	Nellore	2	84	82		9th December 1882 ..	8,936	Indigo straw not well decomposed.
12	Nellore and Aden ..	2	84	67		23rd, 24th November 1882.	7,340	Tolerably good.

The cattle of the Nellore breed would weigh each 700 to 800 lb. ; those of the Mysore breed, each from 500 to 600 lb., and the Adens from 300 to 400 lb. each. About one-third of the fodder of the animals was green. The cattle-boxes were kept always well bedded, and being roofed over no rain water could get amongst the manure. It will be noticed that, much the largest weight of manure was collected in the cattle-boxes occupied by the Nellores, and that in those in which the Adens were, only about half the weight of manure was obtained.

65. The next experiment was made in top-dressing indigo :—

No. of Plot.	Area.	Manures.	Produce.		Produce per Acre.		Average Produce per Acre.	
			Seed.	Straw.	Seed.	Straw.	Seed.	Straw.
	SQ. FT.		LB.	LB.	LB.	LB.	LB.	LB.
1	484	20 lb. Saltpetre	24	95	2,160	8,550	..	..
5	484	20 lb. do.	20	71	1,800	6,390	1,980	7,470
3	484	200 lb. Sulphate of lime	23	89	2,070	8,010	..	..
7	484	200 lb. do.	18½	62½	1,665	5,625	1,867	6,817
2	484	Nothing	21	77	1,890	6,930	..	..
4	484	Do.	19	74	1,710	6,660	..	..
6	484	Do.	16	71	1,440	6,390	..	..
8	484	Do.	17	67	1,530	6,030	1,642	6,502

Several other manural experiments were begun ; but the highly unfavorable season prevented them from being brought to maturity.

66. In Field No. 7, which is intended to be laid out as experimental grounds, some further trials were made in testing the natural condition of the soil, in continuation of those noticed at paragraph 100 of the last report. It will be observed that the outturn of grain varied quite as greatly as did the outturn of pulse. The land is, therefore, clearly unfitted yet for experimental cropping. Efforts will be made by mixing the soils to produce greater uniformity in their condition. The eastern portion of the field comprising six plots will be rejected for experimental cultivation, as altogether unfitted for the purpose. The results of these inquiries show how very necessary it is, before commencing any experimental cropping, that the character of the soil should be thoroughly ascertained. The soil of the eight plots, it is proposed, eventually, to utilize for experimental cropping would, to the ordinary agriculturist, appear very uniform in

character and composition; but, as the results of these trials show, there is a very wide difference in the producing powers of the soils constituting the different major and minor plots. There is, of course, no field which produces on every square yard of its surface exactly the same yield, and it is this irregularity in outturn, even in apparently uniform crops, that makes the practice of determining the yield of a large area by the yield of a few square yards of apparently average crop, so reprehensible. The next statement gives the results of these tests:—

Experimental Field No. 7.

First Year—Crop, Horsegram (*Dolichos Uniflorus*).

Plot	Minor plot	Green plants (lb.)	Dry straw (lb.)	Pulse (lb.)
Plot No. 1.	1.	48	37	7
	2.	95	36	7
	3.	151	29·5	5·75
	4.	106	25·5	5·57
	5.	114	31	8
	6.	74	21·5	4
	Produce of No. 1.	588	180·5	37·5
Plot No. 2.	1.	142	45·5	5·5
	2.	132	32	5
	3.	118	30	3
	4.	132	29	6
	5.	116	30·2	6·7
	6	118	34·5	5·2
	Produce of No. 2.	758	201·2	31·4
Plot No. 5.	1.	78	27·5	5·25
	2.	108	30·	6·75
	3.	74	16·25	4
	4.	64	16·5	5·25
	5.	76	28	5
	6.	107	21·5	5·5
	Produce of No. 5.	507	139·75	31·75
Plot No. 6.	1.	109	36·25	6·5
	2.	108	28·5	4·5
	3.	115	37	7
	4.	96	31·75	5·12
	5.	89	25	3·5
	6.	88	26·75	4·5
	Produce of No. 6.	605	185·25	31·12

Second Year—Crop, Yellow Cholum (*Sorghum Vulgare*).

Plot	Minor plot	Dry straw (lb.)	Grain (lb.)
Plot No. 1.	1.	20	1·75
	2.	44	3·5
	3.	54	3·75
	4.	80	8·25
	5.	56	4·5
	6.	56	4·25
	Produce of No. 1.	310	26
Plot No. 2.	1.	72	4·5
	2.	80	4·75
	3.	80	9·75
	4.	76	8·75
	5.	70	7·75
	6.	56	6·25
	Produce of No. 2.	434	41·75
Plot No. 5.	1.	30	2
	2.	56	6·25
	3.	48	2·5
	4.	80	5·75
	5.	40	3·75
	6.	60	6
	Produce of No. 5.	314	26·25
Plot No. 6.	1.	84	10·5
	2.	82	2·75
	3.	88	7·5
	4.	82	9·75
	5.	64	7
	6.	100	10·5
	Produce of No. 6.	500	48

Live Stock.

67. *Cattle.*—The cattle generally were healthy throughout the year. There was one death from anthrax which created some alarm, as it was feared that this virulent disease had obtained a footing on the farm amongst the Aden stock. Very energetic means were taken to combat the disease by the Inspector of Cattle Diseases; the whole of the cattle were removed from their sheds and placed in temporary sheds erected about half a mile from the farm buildings, the bedding and manure in the cattle sheds at the time was all removed and burnt, and the sheds were thoroughly cleansed, fumigated and lime-washed; and not again used until some time afterwards. No other case of anthrax appeared, but, a case suspiciously like one of "Rinderpest" occurred, also, amongst the Aden cattle; this case also received energetic treatment and, with a successful result.

68. *Aden Cattle.*—The herd now consists of 7 bulls, 5 cows, 1 heifer, 7 bull calves, and 3 heifer calves—total 23. As has been noticed one of the cows died from an attack of anthrax, but otherwise the experiment has progressed very satisfactorily; the animals are all thriving and are in excellent condition. The bulls are very docile, and are readily trained for any kind of work in which cattle are employed; the older ones are lightly worked in ploughs and carts. From their steadiness in the yoke, the Adens are specially useful for tillage operations between rows of standing crop. Considering their small size, some of the cows have milked remarkably well. The old cow, imported in 1874, still thrives; this somewhat remarkable cow was referred to at paragraph 108 in the last annual report; she is now over 15 years of age, and has produced 7 calves since she was imported, and she had a calf at foot at the time. She calved at the end of August 1881, and continued to milk up to 21st of June last. In this milking period (her seventh) the yield of milk was as follows:—

	MEAS.	OLS.
August	4	0
September	93	4
October	113	4
November	103	7
December	95	6
January 1882	95	0
February ,, ...	79	5
March ,, ...	86	5
April ,, ...	89	1
May ,, ...	62	2
June up to 21st	20	0
Total ...	843	2

This is a smaller yield than was obtained in the sixth milking period. The cost of maintaining the cow from August 1881, when she calved until she calved again in October 1882, was as follows:—

	RS.	A.	P.
12,300 lb. of green food	41	0	0
1,121 lb. of ground-nut cake	14	0	0
1,564 lb. of bran	44	11	0
20 lb. of salt	0	10	0
220 lb. of cholum	5	9	0
14 lb. of dholl husk	0	3	9
38 lb. of horse-gram	0	11	0
34 lb. of mixed grains	0	13	10
8 lb. of paddy	0	2	2
18 lb. of rice	0	11	6
Attendance and sundries	20	0	0
Total ...	128	8	3

In accordance with the usual practice, no charge is made for the bedding straw, the manure of the cow being considered as a set-off. During this milking period the cow,

besides yielding the milk recorded, reared a fine bull-calf which, at the end of the period was worth certainly not less than Rs. 40; deducting this amount from the cost of maintaining the cow, Rs. 128-8-3, there remains Rs. 88-8-3, as the cost of the 843 measures and 2 ollocks of milk, which is one anna and 8 pies per measure. During the five milking periods, beginning with 1877, for which only full statistics are available, the yield of milk was—

—	Number of Days between Birth of each Calf, or "Milking Period."	—		—
		MEAS.	OLS.	GALLONS.
Third milking period beginning May 1877 ...	396	832	3	299·41
Fourth do. do. June 1878 ...	335	694	1	249·68
Fifth do. do. Aug. 1879 ...	426	831	1	298·96
Sixth do. do. July 1880 ...	427	965	2	347·21
Seventh do. do. Sept. to 8th Oct. 1881 ...	403	843	1½	304·39
Average ...	397	833	0	299·93

69. The cow produced her eighth calf on the 8th of October, since which time she has yielded milk as below:—

	MEAS.	OLS.	GALLONS.
October ...	62	0	22·59
November ...	116	0	59·92
December ...	125	0	45·12
January ...	125	0	45·12
February ...	110	3	39·84
March ...	120	0	43·32
Total ...	658	3	255·91

If she continues in health, the present "milking period" will probably give the largest outturn of milk yet obtained from the cow and, as in the previous "milking periods" she is rearing a calf.

70. The cow noticed at paragraph 110 of the last report, which was the first daughter of the old cow just referred to, died from anthrax in August; the death of the cow was greatly to be regretted, as she was a very fine specimen of the breed. Another daughter of the old cow, referred to at paragraph 111 of the last report, produced a calf on the 29th of January 1881, when she was but 2½ years of age. The quantity of milk she produced in her first milking period is shown below:—

	MEAS.	OLS.	GALLONS.
February ...	37	6	13·62
March ...	59	2	21·38
April ...	61	5	22·24
May ...	66	3	23·96
June ...	66	4	24·00
July ...	64	1	23·14
August ...	63	1	22·78
September ...	62	7	22·69
October ...	73	1	26·39
November ...	72	5	26·21
December ...	73	5	26·57
January ...	116	4	42·05
February ...	52	0	18·77
March ...	55	0	19·85
Total ...	924	4	333·65

The monthly yield of milk has varied considerably, but the total yield of the period promises to be large. The cow was too young when she produced her first calf; her growth has, apparently, been checked thereby; she was fed in the same way as the old cow, and at about the same expense.

71. The three cows imported from Aden in October 1881, referred to in paragraph 107 of the last report, are now in excellent health; they arrived much out of condition and yielded but little milk for some time. One gave birth to a calf on the 26th of October last, and has since yielded milk as shown below :—

	MEAS.	OLS.	GALLONS.
November	65	2	23·55
December	76	4	27·61
January	67	6	24·45
February	59	0	21·29
March	61	3	13·29
Total ...	329	7	110·19

The oldest of the three imported cows "Banu" produced a calf on the 26th of February last, and has since yielded milk as below :—

	MEAS.	OLS.	GALLONS.
March	77	7	28·11

The youngest of the three cows has not yet calved. These cows are all fed alike.

72. *Kerry Cow.*—This cow was referred to at paragraph 112 of the last report. She calved on the 6th of October 1881, having milked up to the date of calving. Her yield of milk during this period is shown in the next table :—

	MEAS.	OLS.	GALLONS.
October	66	5	24·05
November	97	1	35·06
December	98	5	35·60
January	96	1	34·70
February	71	0	25·62
March	74	5	26·94
April	75	6	27·34
May	51	2	18·49
June	47	3	17·10
July	31	3	11·32
August	3	2	1·17
Total ...	713	1	257·39

The cost of maintaining the cow was about one rupee per month more than the cost of maintaining an Aden cow; due chiefly to the larger quantity of fodder she consumes. She also reared a calf in her "milking period." She calved again on the 28th of October last, and has since yielded the undermentioned milk :—

	MEAS.	OLS.	GALLONS.
November	128	6	46·48
December	159	0	57·40
January	155	0	55·95
February	138	0	49·81
March	134	0	48·37
Total ...	714	6	258·01

If this large yield continued, the outturn of the present "milking period" will be very large. The cow is rearing a fine calf by an Aden bull.

73. *Nellore Cows.*—These were referred to in the last report at paragraph 114. The next table shows the yield of milk of the white cow "Seetha":—

	MEAS.	OLS.	GALLONS.
January 1882	36	1	13·04
February "	80	1	28·92
March "	86	2	31·13
April "	82	4	29·78
May "	86	7	31·36
June "	85	5	30·91
July "	64	7	23·42
August "	71	2	25·72
September "	69	0	24·98
October "	69	4	25·09
November "	58	4	21·11
December "	46	0	16·60
January	28	2	10·19
Total ...	864	7	312·25

From the grey cow "Lutchimee" milk was obtained as below:—

	MEAS.	OLS.	GALLONS.
January 1882	42	6	15·43
February "	84	1	30·37
March "	82	1	29·64
April "	85	3	30·82
May "	85	4	30·86
June "	80	7	29·19
July "	67	4	24·36
August "	70	7	25·58
September "	73	3	26·48
October "	73	0	26·35
November "	62	5	22·60
December "	58	2	21·02
January 1883	45	0	16·24
February "	25	7	9·34
March "	14	4	5·23
Total ...	951	6	343·51

The cows are fair specimens of the breed; they are large and each needs about one-third more food than suffices for an Aden cow; indeed the cost of the keep of one of these cows is not less than 30 per cent. higher than that of an Aden cow. These cows are not nearly so docile as are the Adens; three or four of the latter may safely be penned together without being tied up; but the Nellore cows must either be tied up, or placed in separate pens. As there is a good demand at the farm, during greater part of the year, for all the milk produced, it is but seldom necessary to make butter; but for experimental purposes, and, for the information of the students, butter has occasionally been made, and, some experiments have been tried in making ghee and cheese.

74. *Butter-making.*—A new churn called the Brighton churn was tried. It is on the principle of the Barrel churn; it was tried in competition with an ordinary atmospheric churn; the following are the results:—

No.	Names of Churns used.	Quantity of Milk issued.	Time occupied in the first Churning.	Quantity of Butter obtained.	Time occupied by the second Churning.	Quantity of Butter obtained.	Total amount of Butter obtained.
		OLLOCKS.	MINUTES.	OZ.	MINUTES.	OZ.	OZ.
1	Brighton Churn	$6\frac{1}{4}$	15	1	7	$\frac{1}{2}$	$1\frac{1}{2}$
2	Atmospheric Churn	$6\frac{1}{4}$	9	2	3	$\frac{1}{4}$	$2\frac{1}{4}$

75. The results obtained with the atmospheric churn were much the most favorable; this churn appears to be peculiarly well suited to the requirements of South India. Other experiments produced very similar results.

76. *Ghee.*—The following are the results of some of the experiments made at the farm in ghee-making:—

Milk drawn.	From which Cow.	Quantity of milk used.	Time occupied in first Churning.	Quantity of Butter obtained.	Time occupied in second Churning.	Quantity of Butter obtained.	Total time occupied.	Total quantity of Butter.	Time occupied in making Ghee.	Quantity of Ghee obtained.
Morning.		MS. OL.	MINUTES.	LB. OZ.	MINUTES.	OZ.	MINUTES.	LB. OZ.	MINUTES.	OZ.
29th Nov. 1882 ..	Kerry Cow ..	2 4	25	0 $6\frac{3}{4}$	10	$\frac{1}{4}$	35	0 7	30	$3\frac{1}{4}$
30th " " ..	Do. ..	1 2	16	0 $4\frac{1}{2}$	4	$\frac{3}{4}$	20	0 $5\frac{1}{4}$	13	$2\frac{3}{4}$
30th " " ..	Do. ..	5 0	25	1 $4\frac{1}{2}$	10	$\frac{1}{2}$	35	1 $5\frac{1}{2}$	..	$10\frac{1}{2}$

In making ghee the butter is first made as follows; first the can or vessel containing the freshly-drawn milk is placed in an earthenware vessel of boiling water for about five minutes; the milk, after thus being exposed to a temperature of about 212 degrees, is poured into another vessel, and butter-milk is added, from two to three drops in hot weather, to a teaspoonful in cold weather, per quart of milk, and the vessel with the milk is put aside for 24 hours, and, is then churned. The yield of butter averages from about $1\frac{1}{2}$ to 2 ounces per quart of milk, but of course varies considerably. The butter is melted in an open vessel over a slow fire; the heat coagulates the casein which, with other impurities, sinks to the bottom of the vessel; boiling is continued for from fifteen to twenty minutes, when most of the water is evaporated and the ghee, clear and bright, rests on the heavier sediment covering the bottom of the vessel. The ghee, when cold, is carefully poured off, leaving the sediment behind and is fit for immediate use, or for storing. The outturn of ghee varies with the quality of the butter and the purity of the ghee made; an average outturn is 50 to 60 per cent. of the weight of the butter used, when the butter has been made from the milk of the cow. The yield of ghee from buffalo butter is higher. Ghee is not usually made when a fair price can be obtained for milk or butter. A viss (3 lb. 2 oz.) of ghee sells for usually only about Rs. 1-2-0, and to make this, not less than 6 lb. of butter, or 48 quarts of milk of the cow, would be needed. In nearly all the large towns of Southern India cow's milk will sell readily at Annas 2 per quart and butter at Annas 12 per pound. Thus the milk that would be required to make a viss of ghee worth Rs. 1-2-0 would, as fresh milk, sell for about Rs. 6, and if churned would yield butter worth Rs. 4-8-0.

77. *Cheese-making.*—Attention having been directed to the properties of the berries of the *Withania coagulans* for curdling milk in cheese-making, it was thought desirable to try the properties of a nearly allied plant *Withania somnifera*, a well known plant in South India, where *Withania coagulans* is unknown. In some experiments the following coagulating agents were used:—

(1) Churn milk (Lactic acid).
(2) Lime-juice (Citric acid).
(3) Tamarind-juice (Tartaric acid).
(4) Puneria berries (*Withania somnifera*) (acid not determined).
(5) Bilimbi fruit (*Averrhoa bilimbi*) (do.).
(6) Milky juice of *Epicarpurus orientalis* (Prayam) do.

The milk was heated to about 100° F., and after cooling the curdling agents were added to the different portions set aside for the experiments. The curd on being sufficiently formed was broken up and the whey separated as far as this was possible; the broken curd after a little salt had been added was put into a roughly made cheese press. In one set of experiments twenty-one ollocks of milk were taken and kept aside until the milk was faintly acid to test-paper. The milk was then gently heated to 110° F. and divided into seven portions of three ollocks each. To the first were

added twelve drops of churn milk, to the second twelve drops of lime-juice, to the third twelve drops of tamarind-juice of the consistency of the milk itself, to the fourth about a teaspoonful of the extract of the Puneria berries, to the fifth twelve drops of the juice of the bilimbi fruit, to the sixth the raw juice of twelve Puneria berries, and to the seventh about one drop of the milky juice of *Epicarpurus orientalis* (Tamil—Prayam or Cootty pela). All these agents were tested with blue litmus paper, and they had a distinctly acid reaction. In three hours, the milk treated with the milky juice of the Prayam plant was found to have changed into a very firm cylindrical block of curd with a layer of clear supernatant whey. There is not a doubt but that this is quite equal to rennet, it does not in the least affect the flavor of the cheese nor does it require any preliminary preparation; and it is procurable at all times. The plant is very common, and there are some growing wild on the farm. When the curd produced by this coagulant was put into a dish, it at once formed a circular disc without the least disintegration. The curd was then cut up with a clean bamboo spatula; the greater part of the whey then drained off, and the curds were then evenly mixed up with finely powdered salt at the rate of $3\frac{1}{4}$ ounce to 1 gallon of the curds, and put under the press. The quantity of cheese thus obtained from three ollocks of milk was $2\frac{3}{8}$ ounce or about $6\frac{1}{3}$ ounce, per Madras measure of milk. The quantity of the salt added was found to have been excessive; probably half the quantity would have been quite sufficient. The milk treated with the churn-milk took five hours to curdle, and the curds were not firm, and the curds in the other experiments were even more inferior. It appears that the firmness of the curds depends, not on the strength of acidity in the curdling agent, but on the strength of some fermentative principle in it. The extract of the Puneria berries was prepared by simmering half an ounce of the berries in one ollock of water for about four hours on slow fire. The next statement shows the results of some experiments with berries of the *Withania somnifera* and some other curdling agents.

Number.	Cow.	Date.	Morning or Evening milk and time of Milking.	Quantity of Milk taken for Experiment.	How many Hours heated.	Time allowed for Cooling.	Quantity of Agent used for Curdling.	Agent used for Curdling.	Time taken for Curdling.	Time taken for Straining.	Time in Press.	Time in completing.	Date when completed.	Weight obtained.
														oz.
1	Kerry Cow.	10-4-83 ..	MORNING. 6-30 A.M. ..	2 measures.	2 hours ..	1 hour ..	Few drops.	Butter-milk ..	4½ hours ..	3½ hours ..	12 hours.	23 hours.	11-4-83 ..	14½
2	Do. ..	11-4-83 ..	Do. ..	2 do. ..	2 do. ..	1 do. ..	Do. ..	Lime-juice ..	5½ do. ..	3 do. ..	12 do.	23½ do.	12-4-83 ..	12
3	Do. ..	12-4-83 ..	6-35 A.M. ..	2 do. ..	2 do. ..	1 do. ..	10 berries	Withania Somnifera.	..	3 do. ..	11½ do.	..	13-4-83 ..	11½
4	Do. ..	13-4-83 ..	6-30 A.M. ..	2 do. ..	2 do. ..	1 do. ..	Do. ..	Do. squeezed in water and that water applied.	4⅔ do. ..	H. 3 M. 25	11¾ do.	22⅝ do.	14-4-83 ..	10½
5	Do. ..	14-4-83 ..	6-40 A.M. ..	2 do. ..	2 do. ..	1 do. ..	Do. ..	Do. ..	5 do. ..	3 hours ..	11⅝ do.	22⅝ do.	15-4-83 ..	11½
6	Do. ..	15-4-83 ..	6-35 A.M. ..	2 do. ..	Not heated ..	Not heated ..	Few drops added.	Butter-milk at 6-45 A.M.	H. 11 M. 35	H. 11 M. 40	12 do.	H. 35 M. 15	16-4-83 ..	11¼
7	Do. ..	16-4-83 ..	6-30 A.M. ..	2 do. ..	2 hours ..	1 hour ..	Withania Somnifera. Ten berries squeezed in water and that water applied for curdling in all these experiments.		4 hours ..	4 hours ..	12 do.	23 hours.	17-4-83 ..	10½
8	Do. ..	17-4-83 ..	6-35 A.M. ..	2 do. ..	2 do. ..	H. 1 M. 5			4 do. ..	4 do. ..	12 do.	23 do.	18-4-83 ..	10
9	Do. ..	18-4-83 ..	6-30 A.M. ..	2 do. ..	2 do. ..	1 hour ..			H. 3 M. 45	H. 3 M. 50	12 do.	H. 22 M. 35	19-4-83 ..	11
10	Do. ..	19-4-83 ..	6-40 A.M. ..	2 do. ..	2 do. ..	H. 1 M. 5			3 45	4 5	12 do.	22 50	20-4-83 ..	10½
11	Do. ..	20-4-83 ..	6-30 A.M. ..	2 do. ..	2 do. ..	1 hour ..			4 hours ..	4 hours ..	12 do.	23 hours.	21-4-83 ..	10
12	Do. ..	21-4-83 ..	6-30 A.M. ..	2 do. ..	2 do. ..	H. 1 M. 3			4 do. ..	H. 3 M. 57	12 do.	H. 22 M. 57	22-4-83 ..	10½
13	Do. ..	22-4-83 ..	Do. ..	2 do. ..	2 do. ..	1 hour ..			4 do. ..	3 55	12 do.	22 55	23-4-83 ..	11

It has been found that the best results are obtained with Prayam leaves when using 16 leaves to one measure of milk. The great drawback to the use of this curdling agent is the necessity of taking the milk to be curled, to the tree, as, the minute globules of juice at the fracture where the leaf is broken from the branches, drop off in removing the leaves to the dairy. These experiments will be continued. It may be possible to collect from the leaves of Prayam bush, the coagulating agent, and to store it for future use. Experiments were made with HCl. as a curdling agent; by using this acid, milk curdles at once and the curd can be put under the press about three hours after applying the acid. It has been found that from 8—10 cubic centimeter of acid diluted with two or three times its bulk of water produces the best results.

78. The general results of the experiment was the production of a firm solid curd, some specimens of which had a fairly good taste and resembled inferior cheese. This half-dried curd however differed as widely from cheese, as does the juice of freshly crushed grapes differ from wine. There is apparently no practical difficulty in preparing and drying curd for immediate consumption, but, the great difficulty is to prepare curd in a way to fit it for keeping the requisite time to undergo the ordinary changes which the cheese-manufacturer includes under the term "ripening." In England this occupies several months; but the so-called cheese made in these experiments could not at the time when the experiments were made (the hot season) be kept for a week, putrefaction set in so rapidly accompanied by luxuriant fungoid growth. Perhaps the addition of some antiseptic, boroglyceride, for instance, may improve the keeping quality of newly-made cheese. This matter is now engaging attention. On the average about three measures of milk were required to make 1 lb. of the cheese and if, the ripening processes could be conducted satisfactorily to completion, which could readily be done at Bangalore, or at any of the hill stations, cheese might be produced for sale at under half a rupee per pound. Of course where milk can be sold at 4 annas per measure, it will not pay to make cheese even when it is possible to cure cheese.

79. *Boroglycerine.*—Professor Barff, M.A., of London, who has long been engaged in making experiments with different antiseptic agents in preserving food was good enough to send a small supply of boroglyceride for experimental use on the farm. Boroglyceride is a definite chemical compound formed from glycerine and boracic acid. The value of both borax and glycerine as antiseptic agents has long been recognised; both arrest the fermentation of germs and prevent decomposition and both agents seem perfectly devoid of any deleterious influences when used in food. The following may be noticed among the many experiments that have been made:—

To a measure of fresh milk weighing 40 oz., three-fourths of an ounce of boroglycerine, previously made into a semi-liquid by adding a spoonful of hot water, was mixed through the milk, which was allowed to stand in an open vessel until the following morning when the cream was removed and both it and the milk were perfectly sweet. On the next morning 48 hours after the experiment began the milk was found to be still perfectly sweet and some more cream had risen to the surface which with that previously removed, was made into butter. The experiment was closed on the fifth day when both milk and butter were found still perfectly free from rancidity. The temperature during the time this experiment was carried on is shown in the next table:—

Date.	Maximum Temperature. DEGREES.	Minimum Temperature. DEGREES.
26th	106	81
27th	104	81
28th	104	81
29th	99	78
30th	100	75

80. The next statement gives the results of some experiments made during the cold season.

Number of Experiment.	Date of Experiment.	Morning or Evening Milk.	Quantity of Milk taken for Experiment.	Quantity of Butter obtained.	Quantity of Butter taken for Experiment.	How treated.	Observations and Date of.
			MEAS.	OZ.	OZ.		
1	2nd January 1883.	Morning and evening milk mixed.	5	20	12	Put into a dish and immersed in a solution composed of 1 part boroglyceride and 80 parts water.	10th January 1883. The butter projected slightly above the level of the liquid; this portion was yellow, the portion immersed was white. The taste and smell of the butter were unobjectionable. 20th January 1883. Color of the butter unchanged. Taste good, but smelt rather unpleasant, but the portion above the solution is beginning to putrefy and fungus is appearing on it.
2	Do. ..	Do. ..	5	20	8	$\frac{1}{8}$ oz. of boroglyceride mixed with 8 oz. of butter.	10th January 1883. The quality of the butter has been well preserved; both the taste and color are good. 20th January 1883. The taste of the butter is defective; the color remains good excepting that it is less uniform.
3	3rd January 1883.	Morning milk.	$2\frac{1}{2}$	10	8	Not mixed with boroglyceride the butter was kept as usual.	10th January 1883. Taste fairly good, but smell bad. Color yellow on the outside, but white inside. 20th January 1883. Quite unfitted for food; smell and taste very bad.

81. Other experiments were kindly undertaken by J. Mills, Esq., Veterinary Lecturer in the Agricutural College, who has favored me with the following report :—

To W. R. Robertson, Esq., Agricultural Reporter to Government.

Sir,—With reference to your letter, No. 1807, dated 11th December 1882, I have the honor to submit the report therein called for on the use of boroglyceride as an antiseptic. For results of experiments by submersion see attached return.

2. I am of opinion that it is a most valuable antiseptic, and from its non-irritating, non-corrosive, and soluble nature, it far surpasses either carbolic acid or phenyle, but on the other hand it is inferior to those agents as a disinfectant and deodorizer, in fact it has little or no power as either.

3. As a dressing for wounds and ulcers, it is eminently well suited; it brings about rapid granulation; therefore is highly useful as an application where there has been loss of structure or sloughing. It stimulates ulcers and brings about a healthy re-action with subsequent healing of the part.

4. From its non-poisonous nature, I find that it will not destroy maggots, nor will it prevent them entering a wound, therefore when applied to a part it must be carefully covered over with lint or cotton-wool.

5. It being perfectly harmless enhances its value considerably; because it can be used with the greatest safety by the most inexperienced and ignorant.

6. It is best used in the crude form laid on as a paste, but for slight wounds it may be dissolved in from 10 to 15 or 20 parts of water.

7. At the Veterinary Hospital it has been applied to all kinds of cases, and I decidedly consider it is a most invaluable antiseptic to wounds, &c., and as agent for the preservation of morbid specimens.

No.	Article.	Strength of Solution.	Open or closed Vessel.	Date of Submersion.	Date of Removal.	Number of Days.	State.	Remarks.
1	Shell fish	1 to 20	Closed ..	January 14th.	May 21st ..	128	Perfectly fresh.	
2	Vegetables:—(potato, onion, carrot, turnip, and green chillie).	1 to 20	Do. ..	Do. 19th.	Do. 21st ..	123	Do. ..	Coloring matter of the chillie slightly faded.
3	Parasite (Lumbaice).	1 to 10	Do. ..	Do. 20th.	February 20th.	31	Decomposed.	This specimen never kept well from the first, although perfectly fresh when submerged.
4	Mutton chop ..	1 to 30	Do. ..	February 1st.	Do. 21st.	21	Perfectly fresh.	Was cooked and eaten.
5	Lungs and heart (horse).	1 to 50	Open ..	Do. 1st.	Do. 2nd.	2	Decomposed.	Difficult to keep owing to the air in the lungs.
6	Foot and fetlock (horse).	1 to 50	Do. ..	Do. 1st.	Do. 4th.	4	Perfectly fresh.	Was taken out daily for dissection.

From these experiments it would appear that by using boroglycerine, dairy produce and animal substances can be preserved perfectly fresh for a long time if kept in closed vessels. This new preserving agent promises to be of much value in this country, especially for use in the dairy. At present when butter is made, the milk is always sour, and is therefore unfitted for use in feeding calves; but, when mixed with boroglycerine, the cream can be removed, while the milk is sweet and it may then be given to calves.

82. *Common Salt.*—As usual, salt formed a constituent of the food of all the stock of the farm. Doubts, however, have frequently arisen as to whether the salt issued daily for the stock was invariably consumed by them; the coolies can so readily appropriate the salt for their own use. To prevent this, and to afford the means of judging whether salt is always added in the food of the stock, it was determined to redden the salt by mixing with it 2½ per cent. of red ochre. The presence of the colored salt in the food is readily ascertainable; while, the color does not prejudice the stock in any way against the salt, which from its red color is unlikely to be used as an ingredient in human food. The red ochre is used in such a small quantity it will do no harm whatever to the stock that consume it; while, its cost is but trifling. It is very desirable that salt should be available in this country free of duty for the use of stock and for use as manure. Were a certain quantity of salt colored and set apart for sale where common salt is sold, ryots would have no excuse for not giving their animals salt; and, there can be no doubt but that, the mortality amongst live stock at certain seasons of the year could be considerably lessened by the moderate use of salt in their food. The salt revenue need not suffer by the issue of colored salt free of duty for agricultural use any more than it does in Germany, where salt is also a Government monopoly, and in that country colored salt is always available for agricultural use duty free.

83. *The Food of the Stock.*—As usual, the cattle and sheep were fed chiefly on groundnut-cake; this was obtained under a contract for the year at Rs. 6-10-0 per candy delivered at the farm. Wheat bran was used to some extent, but its average selling price, 36 lb. per rupee, is considerably in excess of its value. From the large demand for bran near Madras for horses, and its very limited production, it has, from being a waste product of the flour mill become valuable produce.

84. *Dholl Husks.*—The husks of dholl (*Cajanus Indicus*) were used with considerable success, especially in the food of the milch cows. It was found that, when the cows were getting a daily allowance of dholl husks, their outturn of milk was invariably larger than when no husks were given.

85. *Sheep.*—There was no contagious disease amongst the sheep. The lambs of 1882 are in a fine lot, they exhibit most of the characteristics of the half-bred rams

that were used. The two half-bred rams have thriven well; but they are now too old for breeding, the wool yielded by these half-bred rams weighed only about 3 lb. per head, but in bulk it was as much as in England would weigh 5 or 6 lb. It has not yet been possible to make any satisfactory arrangements for getting out Merino rams from Queensland; but the matter will not be lost sight of whenever a favorable opportunity may present itself, for the Saidápet flock has now reached the stage of improvement at which the use of Merino rams will be likely to be productive of much good.

86. The number of sheep in the flock, and the number of deaths in the year, along with similar data for each of the previous nine years, appears in the following statement:—

—	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.
Average number of flock..	207	221	237	275	295	274	251	160	92	92
Number of deaths ..	16	24	21	11	31	34	55	136	4	12
Percentage of deaths ..	7·73	10·9	8·94	4	10·5	13·14	21·9	85	4	13
Rainfall .. Inches..	48·07	68·98	38·1	20·88	65·55	33·16	56·95	57·16	44·28	49·81

The death-rate is higher than last year due to the large proportion of old sheep in the flock.

87. The next statement shows the live-stock maintained in the year, the percentage of deaths, and the cost per head of purchased food:—

—	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.
Live-stock maintained, calculated as country cattle	132	135	123	125	102	76	111
Stock as country cattle for 100 acres of cultivable land	82·5	84·37	84·24	88	83·65	63·33	105·7
Percentage of deaths	7·6	12·9	8·9	8·8	16·2	4	7·5
Cost of purchased food a-head per mensem	AS. P. 8 6	AS. P. 10 6	AS. P. 14 5	AS. P. 12 1	AS. P. 12 6	AS. P. 8 9	RS. A. P. 1 6 6

Implements and Tools.

88. The demand for improved implements and tools was greater last year than in any previous year since the farm was opened. It was unfortunately impossible to supply all that were applied for. Efforts were made to induce private firms and individuals to manufacture agricultural implements and tools but, these efforts were in several cases attended with but little success; the demand is a new one in this part of India, and before the industry can be carried on successfully, a considerable capital must be sunk in providing the necessary machines, tools and other appliances. Messrs. Massey and Co., Engineers of Madras, have shown much enterprise in setting apart a portion of their works for the manufacture of agricultural implements, machines, tools, &c., and these gentlemen are now engaged in this new industry with a good prospect of establishing it on a sound basis. Messrs. Oakes and Co., of Madras, are also engaged in the trade, having become the local agents for several extensive firms of implement manufacturers. Dr. Dhanakoti Raju, of the Tangal Works, Saidápet, has begun to manufacture iron ploughs, and A. Sankaralingum Auchary, "Locksmith" of Dindigul, is now also engaged in the work. It was hoped that Messrs. Groves and Co., Agricultural Engineers of Coonoor, would have been able to make ploughs, &c., for sale on the Nílgiri Hills, in Coimbatore, &c., and pattern ploughs were sent to them; but, Messrs. Groves and Co. found that the cost of labor and materials were too high at Coonoor to admit of implements being made there at the price at which they can be made on the plains. It is hoped that, at the Famine Orphanage at Karúr, it will be possible to make up ploughs for local requirements. Patterns of ploughs are sent from the farm on loan to any respectable person desiring to make similar ploughs, and this privilege has been availed of in several instances; while a considerable number of ploughs have been sold as patterns.

89. The next statement shows the implements and tools sold during the year :—

Districts.	Improved Country Ploughs.	Swedish Ploughs No. 29A.	Single-stilted Swedish Ploughs.	Iron Ploughs of various kinds.	Drag Harrow, Grubber and Bullock Hoe.	Parts of Ploughs.
Madras	4	4	1	9	...	6
Chingleput	2	...	...	...	1	1
Madura	5	2	...	1	...	8
South Arcot...	2	1	1	1	1	1
North Arcot	9	...	1	2	...	...
Tanjore	32	...	...	...	...	...
Tinnevelly	2	1	...	3	...	1
Coimbatore	2	...	...	...	...	2
Salem	...	6	...	...	...	...
Nílgiris	...	...	1	...	1	...
Mysore	4	...	1	3	3	2
Bangalore	4	3	...	...	2	7
Nellore	...	...	...	...	...	1
Cuddapah	6	...	1	...	1	...
Bellary	...	...	1	...	...	...
Kurnool	5	26	...	2	...	25
Kistna	1	8	...	3	...	...
Godávari	...	...	1	...	...	...
Hosúr	...	2	...	...	1	6
Bhandara	...	...	1	...	1	...
Raichore	1	...	...	...	...	...
Sholapore	...	...	1	1	...	...
Bombay	...	6	1	...	...	25
Jampur	...	...	1	...	...	...
Cawnpore	2	2	1	...	...	6
Total ...	81	61	13	25	11	91

90. At the close of the year the registered applications for ploughs remaining to be met, included 122 ploughs of different kinds.

91. The Swedish plough having proved so successful in one or two districts (*vide* paragraph 122 of the last report) 270 were imported, of which most were distributed over the Presidency, one in each taluk. This matter will be found noticed in the portion of the report referring to district operations. The ploughs thus distributed for experimental trial are not included in the above statement.

92. The plough referred to in the latter portion of paragraph 126 of the last report has come much into favor for wet land cultivation for which it is fairly well suited; while, its draught is within the power of an ordinary pair of cattle. The plough is less than 30 lb. in weight and being made entirely of iron excepting the pole, it is compact and durable. Messrs. Massey and Co., Engineers of Madras, have undertaken to make them at Rs. 126-8-0 per score, which is a very moderate price.

93. Modifications have been introduced in several of the ploughs experimented with during the year which, it is hoped, will render them more efficient and better adapted to the requirements of South Indian farming. This, is the legitimate work of an Experimental Farm and not the manufacture of ploughs for sale. Until recently the farm was compelled to engage in the manufacture of ploughs for sale; persons desirous of introducing improved ploughs could not procure them without incurring much trouble and expense, excepting through the agency of the farm. However as, this is no longer the case, it is proposed in future to confine the work of the Farm Workshops chiefly to the manufacture of new implements that appear to be worthy of

a trial and to afford the necessary aid in adapting implements to the requirements of Native agriculture or in modifying and improving Native implements. When a good pattern implement has been obtained, copies can be multiplied to any extent by Messrs. Massey and Co. or any of the firms and individuals before mentioned, and possibly, other enterprising men will be willing to engage in the industry.

94. The new implements referred to in paragraph 128 of the last annual report has proved a very useful one for stirring the soil deeply; for sub-soiling, it is a most efficient implement, it will stir moderately free soil to a depth of from 15 to 16 inches —a greater depth than can be reached by any other implement on the farm. It is strong, simple in construction and moderate in cost. A copy on a large scale has been made for use in stirring deeply black cotton soils.

95. The next statement shows the cost of making up at the farm, the four kinds of ploughs in greatest demand :—

Description of Ploughs.		Materials.	Labor.	Supervision, Interest, &c.	Total Cost.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Single-stilted Swedish Plough—					
Coal	1 4 0				
Iron	7 8 0				
Wood	0 2 0				
Sundries (paint)	0 8 0				
		9 6 0	..	..	9 6 0
Smiths' labor	5 0 0				
Carpenters' labor	0 8 0				
		..	5 8 0	..	5 8 0
Add 10 per cent. of cost for wear and tear of tools and interest on capital		..	..	1 7 9	1 7 9
Ten per cent. for supervision		..	..	1 7 9	1 7 9
Total ..		..	..	..	17 13 6
	RS. A. P.				
Improved Country Plough with Iron Stilt—					
Coal	0 7 0				
Iron	2 15 0				
Wood	0 8 0				
Sundries	0 3 0				
		4 1 0	..	..	4 1 0
Smiths' labor	2 0 0				
Carpenters' labor	0 4 0				
		..	2 4 0	..	2 4 0
Add 10 per cent. of cost for wear and tear of tools and interest on capital		..	..	0 10 1	0 10 1
Ten per cent. for supervision		..	..	0 10 1	0 10 1
Total ..		..	..	..	7 9 2
	RS. A. P.				
Improved Country Plough with Wooden Stilt—					
Coal	0 7 0				
Iron	2 11 0				
Wood	0 11 0				
Sundries	0 3 0				
		4 0 0	..	..	4 0 0
Smiths' labor	2 0 0				
Carpenters' labor	0 7 0				
		..	2 7 0	..	2 7 0
Add 10 per cent. of cost for wear and tear of tools and interest on capital		..	..	0 12 1	0 12 1
Ten per cent. for supervision		..	..	0 12 1	0 12 1
Total ..		..	..	..	7 15 2
	RS. A. P.				
Primitive Plough—					
Coal	0 12 0				
Iron	4 0 0				
Wood	1 0 0				
Sundries	0 6 0				
		6 2 0	..	..	6 2 0
Smiths' labor	2 8 0				
Carpenters' labor	0 8 0				
		..	3 0 0	..	3 0 0
Add 10 per cent. of cost for wear and tear of tools and interest on capital		..	..	0 14 7	0 14 7
Ten per cent. for supervision		..	..	0 14 7	0 14 7
Total ..		..	..	..	10 15 2

96. The concession referred to at paragraph 123 of the last report was availed of to a larger extent than last year, the total expense incurred on this account having been Rs. 64-2-0 which is 16 per cent. on the price of the implements sold.

97. Of the consignment of 250 ploughs imported in November, a number were sold with a quantity of spare working parts, for which Rs. 990 were received and credited under " Implements," Saidápet Experimental Farm.

98. Messrs. Ransome, Head and Co. of Ipswich, sent to the Farm ploughs of three varieties, which they had specially made to suit South Indian requirements and which they were anxious to have tried at Saidápet. The ploughs are distinguished as W.K.S. (modified form), K.W.S., and W.S.R.A.W. The plough W.K.S. is a small one ; it is made of wood and has iron working parts ; it is neat and compact and weighs only 28 lb. The plough K.W.S. is made of iron, it weighs 52 lb. ; but, is without a wheel or a coulter ; these if, added will increase the weight about 12 lb. and add to the cost of the plough. Plough W.S.R.A.W. is a wooden plough with iron working parts ; it also, is well made and compact and its weight is 53 lb. The following are the results of some trials made with these and other ploughs :—

Name of Plough.	Furrow Average		Cross Section of Furrow in square inches.	Average Draught.
	Width.	Depth.		
	INCHES.	INCHES.		LB.
1. Ransomes' iron plough B.F.I.	9·25	5·62	51·98	196
2. Ransomes' wood plough W.K.S. ...	6·58	4·66	30·66	145
3. Ransomes' iron plough K.W.S. ...	9·00	6·33	56·97	289
4. Ransomes' wood plough W.S.R.A.W. ...	11·25	7·75	87·18	392
5. Newly-imported Swedish plough 29 B ...	9·58	5·5	52·69	172

The soil of the field in which the ploughs were tried was a sandy loam in good condition and was in a favorable state for ploughing. Plough W.K.S. (modified form) cut a first-class furrow ; but, the plough is scarcely strong enough for ordinary work. Plough K.W.S. loosens the soil very well and made a fairly good furrow but the draught was heavy due partly to the abruptness of the mould-board and to the absence of a wheel ; being entirely of iron, the plough is better adapted for general use. Plough W.S.R.A.W. will plough deeply and cut a good furrow but, the draught is very heavy. The mould-board of this as well as that of K.W.S. need alteration. The ploughs will be worked on the Farm in view to giving them a full trial.

99. Messrs. Ransomes and Co. sent to the farm also a large iron plough which they had constructed specially for stirring deeply black cotton soils. Only one or two trials have yet been made with this plough. The following are the results of an experiment made with it, and two others, working under similar conditions :—

Name of Plough.	Width of Furrow.	Depth of Furrow.	Area of Furrow Section.	Draught.	Weight of Plough.
	INCHES.	INCHES.	SQ. INCHES.	LB.	LB.
Ransomes' new plough	11·2	6·16	68·99	560	164
Swedish plough 29 B	7·5	7·25	54·37	450	94
Ransomes' small iron plough ...	7·8	6·5	50·70	406	97

The new plough has a digging breast in addition to the ordinary mould-board. When working with the digging breast it turned the soil over very efficiently, but not to a great depth. The furrow slice was very wide indeed much wider than seems to be necessary. The plough is certainly not adapted for deep ploughing that is, deeper

than 6 inches. However it will be experimented with fully in the black cotton soils of Bellary, to which place the plough has been sent for trial by Messrs. Massey and Co., the local agents for Messrs. Ransomes and Co.

100. The ploughs, it will be seen require some improvements but they exhibit a considerable advance on any English ploughs yet sent to this country for the use of ryots.

101. Models of the double mhote are still in request and a number were supplied free of charge to applicants. This water-lift is still the best that has been experimented with on the farm. Efforts are being made to reduce its cost and to get a more durable material for making the mouth-pieces of the buckets—points that still need careful attention.

102. A single mhote was erected side by side with a double mhote, the former was found to require a pair of cattle to work it and the latter was worked by a single bullock. It was found that the two lifts raised nearly the same amount of water, but while the draught of the double mhote was only about 70 lb., that of the single mhote was nearly 400 lb. which is considerably above the power of an ordinary pair of cattle in a full day's work, and must cause rapid deterioration in the cattle.

Ryot Deputations.

103. The Farm was visited by several deputations of ryots from the districts during the year, and a considerable number visited the Farm during the time the exhibition was open.

Miscellaneous.

104. *Estate Works.*—A new sluice was constructed in the Mylapore Tank by which to obtain water for the irrigation experiment to be instituted next year, thus, supplying a long-felt want. The embankments for carrying the water have been partly constructed and it is hoped that the ground will be all laid out in experimental plots, with the necessary measuring cisterns and drainage gauges, before the close of the present year. Arrangements have been made for the erection of new Commissariat Slaughter-house on a site distant from the Farm, and for the transfer of the present Slaughter buildings to the Farm. A piece of land bounded on the west and north by the Mount Road and Roshunbaugh village, on the south by the Nullah, and on the east by casuarina and guava plantations has been fenced off and transferred to the Inspector of Cattle Diseases. The Veterinary Hospital is situated on the land, but is quite isolated, from the Farm. Part of field No. 1 was sub-soil drained in the usual way; the Farm buildings, hedges, roads, and water-channels were maintained in good repair.

105. *Pisciculture.*—Through the kindness of the Hon. H. S. Thomas, the Farm was supplied with some young *gouramie* which had been bred in a pond in the Government House Park, at Madras. The young fish were placed in two tanks which had previously been thoroughly dragged and the predaceous fish killed. Aquatic plants were planted in both tanks. It is yet too early for any opinion to be formed regarding the experiment. The fish on attaining sufficient size will be put in the preserved portion of the Adyar river. The *gouramie* is a valuable fish and it is hoped that the experiment will prove successful. Beyond preventing unauthorized netting with small mesh nets, nothing has been done to increase the supply of fish in the upper portions of the Adyar belonging to the Farm; but the fish have multiplied enormously while, the better kinds are more numerously represented, the "Valay," it is satisfactory to note, is found in fewer numbers than was the case formerly; which probably, is to be attributed to the periodical nettings at which all the predaceous captured are killed. The stock of fish maintained in the portions of the Adyar preserved by the Farm must contribute greatly to keep up the stock of fish throughout the whole river.

106. *Sericulture.*—Some small experiments were made with silkworms. The eggs were received from the North-West Provinces, Kashmir and China; the former, were the most successful. The worms from the Kashmir and China eggs were very sickly and most of them died without making cocoons. Probably the reason of this was

the lateness of the season when the eggs reached Saidápet, and the consequent high temperature at the time, a temperature considerably higher than that of the localities from which the eggs were obtained. The experiment with eggs from the North-West Provinces was more satisfactory, but far from successful. A number of the worms made cocoons but, they were small and very light in weight. Of the eggs from the moths bred during the experiment a small quantity was sent to the Tinnevelly District and the remainder kept for further experiments. The worms had always an abundance of mulberry leaves. Arrangements are being made for repeating the experiment next season with eggs to be obtained from the North-West Provinces.

107. *Model Farm.*—Orders have been issued for the establishment of a Model Farm on the Saidápet estate, to be worked on *commercial* principles. These instructions will be carried out next season. If, it is necessary that such an undertaking should be taken in hand it is, at the least, very undersirable that it should be instituted under such unusual circumstances, and special conditions, as must be encountered at Saidápet.

108. *Finances.*—The usual cash statements appear below :—

SAIDAPET EXPERIMENTAL FARM.

Statement of the Accounts of the Saidápet Farm for the Year 1882-83.

Balance Sheet, 31st March 1883.

Liabilities.	RS.	A.	P.	*Assets.*	RS.	A.	P.
Capital	25,925	10	11	Valuation on 31st Mar. 1883...	26,114	7	0
Due to sundry persons ...	437	8	0	Due by sundry persons ...	248	11	11
Total ...	26,363	2	11	Total ...	26,363	2	11

Cash Account for 1882-83.

Receipts.	RS.	A.	P.	*Expenditure.*	RS.	A.	P.
Capital advanced by Government during the year	5,237	4	1	Establishment	1,436	12	2
Implements and Machines ...	*2,333	9	10	Cooly Labor	2,999	15	4
Live Stock	1,217	13	2	Implements and Machines ...	2,530	9	5
Crops	1,854	9	0	Live Stock	1,822	12	0
Sundries	187	4	3	Seeds	525	3	10
				Manures	511	0	4
				Despatching seeds	592	9	3
				Contingencies	411	10	0
Total ...	10,830	8	4	Total ...	10,830	8	4

Profit and Loss Account.

	RS.	A.	P.		RS.	A.	P.
Establishment	1,419	12	2	Implements and Machines ...	286	7	11
Despatching seeds	592	9	3	Capital for balance	4,261	7	7
Labor	505	11	7				
Crops	1,041	13	5				
Live Stock	743	15	10				
Sundries	244	1	3				
Total ...	4,547	15	6	Total ...	4,547	15	6

* Includes Rs. 990 received for Swedish ploughs.

Valuation of Saidápet Farm and Estate on the 31st March 1883 compared with that made on the 31st March 1882.

—	Valuation of Stock on the 31st March 1882.			Increase in the Year.			Decrease in the Year.			Valuation of Stock on the 31st March 1883.		
Farm.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
Live Stock (*a*)	2,880	8	0	678	4	5	...			3,558	12	5
Fruit and Fuel Trees and Crops	17,072	0	0	0	5	10	...			17,072	5	10
Manures	110	1	0	...			7	2	7	102	14	5
Implements (*b*)	5,014	7	0	365	15	4	...			5,380	6	4
Total ...	25,077	0	0	1,030	4	5	...			26,114	7	0
Estate.												
Land	35,000	0	0	...			...			35,000	0	0
Buildings (*c*)	22,800	0	0	...			300	0	0	22,500	0	0
Wells and Channels ...	7,000	0	0	...			...			7,000	0	0
Total ...	64,800	0	0	...			300	0	0	64,500	0	0

(*a*) Includes live stock and cattle food. Increase due to births, &c.
(*b*) Increase due to the purchase of implements and machines and value of the stock of spare working parts of the Swedish ploughs.
(*c*) Decrease due to the less value of Farm bungalow.

PART IV.

DEPARTMENTAL.

Office-work.—The correspondence, and other work of the office continue to increase; the office establishment is on far too small a scale to admit of work being despatched with sufficient promptitude and regularity. Arrears of work are steadily accumulating in spite of long office-hours and few holidays. The Agricultural Exhibition made a considerable demand on the office staff which was only partly met by temporary additional assistance. The number of official letters issued in the year was, including 803 Agricultural Exhibition letters, 3,771; in the previous year, the number was 2,187. These numbers do not include departmental and demi-official letters of which there were written upwards of 2,500. This, shows a very large increase in the general interest taken in the work on which the department is engaged, and is, so far, a ground for congratulation but, it is greatly to be hoped that means will soon be provided for meeting the so rapidly increasing demand on the office establishment. The subjects on which information was sought, were generally very similar to those stated in previous reports, but it may be noted that a much greater interest is now taken in improved implements and machines. The increase in the number of letters received from native landholders and cultivators was fully 50 per cent.

2. *Agricultural Reportership to Government.*—Under the arrangements prescribed in Government Orders 350 and 351 of the 29th of March 1882, Mr. Robertson in November became Agricultural Reporter to the Madras Government, in addition to his other offices. No change has yet been made in the working of the department except that, it is now controlled by the Director of Revenue Settlement and Agriculture, instead of, directly by the Board of Revenue.

3. *Exchange of Publications.*—The publications received during the year in exchange for those of this department were the same as those received in the previous year—*vide* paragraph 36 of the last report.

4. *Personnel.*—Mr. C. Benson, M.R.A.C., Assistant Superintendent, Government Farms, was absent on furlough until the 9th of November when he returned to Madras and resumed his duties; since then, he has been employed as Agricultural Lecturer in the School of Agriculture. Mr. Kaspar Schiffmayer, Assistant Superintendent, Government Farms, was in charge of the Saidápet Farm during the year; it had been arranged that his connection with the department should terminate at the close of the year, but this arrangement could not then conveniently be carried into effect. Mr. C. K. Subba Row, Deputy Superintendent, was in charge of the Botanical and Experimental grounds during the year; he was also employed in the School of Agriculture, for some time in conducting Tutorial Agricultural classes, and afterwards as First Master, during the absence on leave, and afterwards on the death, of Mr. Ganapathy Iyer, the First Master. He was also employed in connection with the Agricultural Exhibition. Mr. J. G. Young, who for many years had been Overseer of the Saidápet Farm, was appointed Keeper of the Veterinary Hospital in May, and the duty of the Farm Overseer has since been performed by Mr. S. Ramasawmy Iyer, a passed student of the School of Agriculture. Mr. Ponnurunga Pillay, Farm Storekeeper, was appointed Superintendent of Guindy Park, and his place has been filled by Mr. S. Rajagopal Moodelly. There has been no change in the office establishment, each member of which, has worked well, under the too long continued adverse circumstances, mentioned at paragraph 37 of the last General Report.

5. *Finances.*—The following statement shows the income of the department and the expenditure on various objects during the year:—

Receipts.	RS.	A.	P.	Expenditure.	RS.	A.	P.
Balance on the 1st of April 1882.. ..	2,71,582	3	11	General Supervision	23,284	12	5
Surplus Pound Fund	29,185	14	5	Saidápet Experimental Farm	10,830	8	4
Saidápet Experimental Farm	* 5,593	4	3	School of Agriculture	24,843	3	9
School of Agriculture (Rents and Sale of Books)	334	13	3	Estate Charges and Improvements ..	2,486	9	9
Inspection of Cattle Diseases	120	12	1	Inspection of Cattle Diseases	8,808	11	3
				Value of, and freight on, Swedish ploughs, &c., imported for District operations, and freight and boat-hire on seeds, &c., distributed	7,189	11	2
				Balance in favor of the department on the 1st of April 1883	2,29,273	7	3
Total ..	3,06,816	15	11	Total ..	3,06,716	15	11

* Includes Rs. 990 received for Swedish ploughs.

6. The next statement shows the income and expenditure of the department for the year, and, for the previous three years:—

Items.	1879-80.	1880-81.	1881-82.	1882-83.
	RS.	RS.	RS.	RS.
Receipts—				
Provincial Grant	20,000	20,000	20,000	...
Surplus Pound Fund	44,219	41,694	46,832	29,086
Departmental Receipts	4,212	4,003	4,992	6,049
Total ...	68,431	65,697	71,824	35,135
Expenditure—				
General Supervision	16,034	17,196	21,468	23,285
Saidápet Experimental Farm	10,773	7,637	10,198	10,830
School of Agriculture	28,798	15,401	20,325	24,843
Estate Charges and Improvements ...	3,499	3,531	2,811	2,487
Inspection of Cattle Diseases	...	...	...	8,809
District Operations	...	...	...	7,190
Total ...	59,104	43,765	54,802	77,444

(Signed) W. R. ROBERTSON, M.R.A.C.,
Agricultural Reporter to Government.

27th July 1883.

ENCLOSURE No. 1.

APPENDIX I.

Statement showing the Monthly Rainfall during 1882-83 compared with the Average of the previous Thirteen Years.

Month.	1882-83.		Average of 13 Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
April	...	...	·22	·5
May	...	...	3·50	1·8
June	·95	3	2·40	5·9
July	2·80	15	3·68	8·6
August	5·63	13	4·87	9·6
September	3·59	7	6·22	8·7
October	8·34	12	10·53	12·6
November	28·47	16	13·56	13·0
December	·03	1	4·21	5·9
January	...	...	·79	1·4
February	...	...	·88	·5
March	...	...	·27	·5
Total ...	49·81	67	51·23	69·0

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APPENDIX II.

Statement showing the Weekly Rainfall during 1882-83 with the Average of the previous Thirteen Years.

Weeks.	1882-83.		Average of the previous 13 Years.		Weeks.	1882-83.		Average of the previous 13 Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.		Rainfall.	Wet Days.	Rainfall.	Wet Days.
1st Week.	..	..	·17	·15	27th Week.	2·00	3	2·13	2·77
2nd ,,	..	..	·00	·07	28th ,,	1·74	3	1·29	1·68
3rd ,,	..	..	·03	·16	29th ,,	1·41	3	2·79	2·74
4th ,,	..	..	·00	·07	30th ,,	2·92	2	3·17	3·05
5th ,,	..	..	1·18	·45	31st ,,	·27	1	1·83	2·39
6th ,,	..	..	·08	·23	32nd ,,	2·39	3	2·71	2·71
7th ,,	..	..	·13	·46	33rd ,,	7·65	4	4·28	4·23
8th ,,	..	..	1·00	·54	34th ,,	9·02	5	2·94	3·15
9th ,,	..	..	·11	·31	35th ,,	9·44	5	3·17	2·45
10th ,,	·09	1	·53	·52	36th ,,	..	..	1·81	1·68
11th ,,	..	..	·92	1·38	37th ,,	..	..	·50	1·61
12th ,,	·01	1	·34	1·23	38th ,,	..	..	·58	1·15
13th ,,	·85	1	·39	1·76	39th ,,	..	..	·47	·92
14th ,,	·89	5	·64	1·29	40th ,,	..	..	·31	·26
15th ,,	1·15	4	·77	1·85	41st ,,	..	..	·05	·07
16th ,,	·15	1	·30	2·05	42nd ,,	..	..	·39	·62
17th ,,	·46	3	·69	2·06	43rd ,,	..	..	·13	·38
18th ,,	·43	4	1·33	2·22	44th ,,	..	..	..	..
19th ,,	1·00	4	1·34	2·54	45th ,,	..	..	·51	·38
20th ,,	·39	2	1·25	2·15	46th ,,	..	..	..	..
21st ,,	1·88	3	·75	1·93	47th ,,	..	..	·28	·15
22nd ,,	2·15	3	1·11	2·07	48th ,,	..	..	·03	·07
23rd ,,	2·88	4	1·89	2·44	49th ,,	..	..	·12	·30
24th ,,	·06	1	1·50	2·31	50th ,,	..	..	..	..
25th ,,	·58	1	1·58	1·64	51st ,,	..	..	·23	·15
26th ,,	..	..	·95	1·03	52nd ,,	..	..	·05	·07

APPENDIX III.

Statement showing the Number of Stock maintained during each Month of the Year 1882-83.

—	1882.									1883.		
	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.
Cattle	44	44	44	44	43	43	46	46	46	46	46	44
Sheep	115	102	94	94	90	86	87	87	86	86	89	88
Equivalent as country cattle of 300 lb. live weight	104·4	102·6	101·4	101·4	98·9	98·3	104·4	104·4	104·3	104·3	104·7	105·6

2 Country Cattle = 1 Farm Cattle.
5 Sheep = 1 Country Cattle.

APPENDIX IV.

Cost of Purchased and Farm-grown Food supplied to the Live Stock during the Year 1882-83.

—	Working Cattle.		Cows and Calves.		Sheep.		Amount supplied.	Value.
	Amount.	Value.	Amount.	Value.	Amount.	Value.		
	LB.	RS. A. P.		RS. A. P.		RS. A. P.		RS. A. P.
Ground-nut Cake ..	29,592	414 4 7	15,890¾	222 7 6	14,017	196 10 2	59,499¾	833 6 3
Bran	1,502	30 0 8	10,118¾	809 8 0	2,537½	50 9 9	14,158¼	890 2 5
Dholl-husk	3,674	55 10 8	6,965	105 8 6	..	..	10,639	161 3 2
	OZ.						lb. oz.	
Salt	814 13	25 2 5	419-4½	12 15 1	300-6¾	9 4 4	1,534 8¼	47 5 10
Grains	1,614	40 5 7	2,336½	508 6 7	95½	2 6 6	4,046	551 2 8
Cotton Seed	217	5 6 10	1,264½	31 9 10	..	..	1,481½	37 0 8
Corcapilli Seed ..	..	..	..	..	210½	13 2 6	210½	13 2 6
Horse-gram	60	1 3 2	916	18 5 3	581½	11 10 1	1,557½	31 2 6
Arrowroot tubers ..	686	3 6 8	1 flour	0 4 7	..	..	686	3 11 3
Brinjals	84	2 10 0	..	..	..	..	84	2 10 0
Sweet Potatoes ..	40	0 3 2	..	..	..	..	40	0 3 2
Rice	20	0 13 4	335¾	13 15 11	27¾	1 2 6	383½	15 15 9
Maize	..	..	355	17 12 0	..	..	355	17 12 0
Total ..	..	579 3 1	..	1,740 13 3	..	284 13 10	..	2,604 14 2
Deduct one-third charged to Manure.	..	193 1 0	..	580 4 5	..	94 15 3	..	868 4 8
Net Charge ..	..	386 2 1	..	1,160 8 10	..	189 14 7	..	1,736 9 6
Cost per Head per Mensem	..	1 5 9	..	4 10 10	..	0 2 9	..	1 6 6

APPENDIX V.

Statement of the Accounts of the Madras Agricultural Department for the Year 1882-83.

Expenditure.

	RS. A. P.	RS. A. P.
1. General Supervision—		
Establishment	*20,560 15 4	
Travelling Allowance	473 7 0	
Stationery	353 10 0	
Exhibition of Improved Ploughs ...	20 13 0	
Contingencies	1,353 1 4	
Allowance to Surgeon for Medical Charge	522 13 9	
		23,284 12 5

* Includes Rs. 353-5-4, pay to Agricultural Reporter, to be debited separately—*vide* G.O., No. 777, Revenue, dated 23rd June 1883.

	RS. A. P.	RS. A. P.
2. Saidápet Experimental Farm ...	......	10,830 8 4
3. Educational (School of Agriculture)—		
Establishment	3,659 2 7	
Stipends and Scholarship	4,398 7 2	
Lecture Fees	10,260 0 0	
Prizes	12 0 0	
Chemicals and Laboratory Apparatus.	203 14 3	
Books	144 11 8	
Contingencies	961 3 0	
Botanical Grounds	893 4 9	
Veterinary Hospital Ordinary Establishment Charges	1,201 1 6	
Medicines, &c., for the Veterinary Hospital	200 0 7	
Maintenance of Buildings	1,779 10 3	
Repair of Veterinary Hospital Keeper's Quarters	287 12 10	
Travelling Allowance for Stipendiary Students	841 15 2	
		24,843 3 9
4. Estate Charges and Improvements—		
Repairs to Superintendent's Quarters.	729 13 5	
Repair and Improvement to Farm Buildings	954 0 7	
Repair and Improvements to Roads.	161 7 3	
Sundry Repairs and Improvements ...	367 1 2	
Extension and Repair of Water Channels	274 3 4	
		2,486 9 9
5. Inspection of Cattle Diseases—		
Establishment	5,423 5 3	
Travelling Allowance	1,342 1 6	
Stipends for Veterinary Students ...	1,288 8 10	
Medicines for distribution to Districts.	399 9 2	
Office Furniture	120 0 0	
Contingencies	235 2 6	
		8,808 11 3
Transfers—		
Value of, and freight on, Swedish Ploughs, &c.	......	6,838 4 10
Freight and boat-hire on Seeds, &c., distributed	......	351 6 4
		77,443 8 8
Adjusted balance at the beginning of the year	2,71,582 3 11	
Income—		
Receipts from the Surplus Pound Fund during 1882-83	29,085 14 5	
Saidápet Experimental Farm ...	5,593 4 3	
School of Agriculture (Rents and Sale of Books, &c.)	334 13 3	
Inspection of Cattle Diseases ...	120 12 1	
		3,06,816 15 11
Balance in favor of the Department on the 1st of April 1883	......	2,29,273 7 3

(Signed) W. R. ROBERTSON, M.R.A.C.,
Agricultural Reporter to Government.

ENCLOSURE No. 2.

Statement showing the Acreage of Crops sown in the District, in the Month of 188 (1883-84).

—	I. Food-grains or Corn Crops.														II. Seeds.	
	Rice.															
	One Crop Irrigated.	Second Crop Irrigated.	Unirrigated.	Cholum.	Wheat.	Ragi.	Varagu or Arikalu.	Cumbu.	Korralu or Tenai.	Millet or Samai.	Varigalu.	Pulses.	Miscellaneous Crops.	Total.	Coriander Seed.	Castor or Lamp Oil Seed.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.
Grand Total to date ..																

Statement showing the Acreage of Crops sown in the District, in the Month of 188 (1883-84)—(*Continued*).

	II. Seeds—(*Continued*).			III. Green and Garden Crops.				IV. Special Crops.								Total Area under all Crops.
—	Gingelly Oil Seed.	Other Oil Seeds.	Total.	Chillies.	Turmeric and Saffron.	Other Garden and Vegetable Crops.	Total.	Hemp and Flax.	Cotton.	Coffee, Tea and Cinchona.	Cardamom.	Indigo.	Sugarcane.	Tobacco.	Total.	
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.
Grand Total to date ..																

N.B.—Brief remarks on the season would be very useful.

ENCLOSURE No. 3.

Cattle Disease Inspection.

DEPARTMENT.—I assumed charge of the department on the 18th of August 1882, therefore the report I am now about to submit cannot be looked upon as complete as far as the statistical part goes; that is, the complete statistics for the year.

The department is now composed of inspector of cattle diseases one, deputy inspector of cattle diseases one, probationary local cattle disease inspectors nine, but when complete, according to G.O., No. 1917, of 12th December 1881, it will consist of 27 local cattle disease inspectors in addition to the inspector and deputy inspector.

There can be little doubt as to the utility of such a department for the prevention of animal plagues in general, which cause such large losses annually both to Government and cattle-owners; and it must be admitted that great good will be done when it is properly organized and in thorough working order, even in spite of the many difficulties which have to be contended with.

The mode of working is as follows: each collectorate is supplied with 100 doses of medicine for the most prevalent diseases and a half-gallon tin of phenyle for disinfecting and dressing purposes. This supply is always kept up, thus ensuring aid being at hand until assistance can be sent from head-quarters.

The deputy inspector is kept continually itinerating and has worked well; in fact, no one could have done more than he has during the time he has been my immediate subordinate. His work, especially in the Trichinopoly and Kistna districts, where two of the worst outbreaks of the year took place, left nothing to be desired. He thoroughly understands the work and would be difficult to replace.

The probationers have, with few exceptions, adapted themselves very well to their work; in fact, much better than I anticipated, because there are many menial duties to be performed by them which I certainly thought would be the stumbling block to their employment in the capacity of cattle inspectors; this, however, I have been agreeably surprised in, and there is no difficulty in getting them to do what they are told; of course, when they are beyond my immediate controlling power, they may act somewhat differently, but it is to be hoped not, nor do I think, from what I know of them, that they will.

Their teaching is thoroughly practical, and particular attention is paid to instruct them in any subject in which they are found deficient. Every precaution is taken to see that they have a thorough knowledge of contagious cattle diseases, and the best and most recent and scientifically approved and accepted means of treating, arresting and preventing them.

HOSPITALS.—This institution was opened on the 1st June 1882, and has been working most successfully ever since.

Building.—These consist of surgery class-room, stables, dissecting shed, shed for out-door classes and hospital-keeper's quarters.

Working.—The hospital with instruments and drugs is under the immediate charge of the hospital-keeper.

The following books are kept:—

(1) A register in which the description, result of treatment, &c., of each patient is entered;
(2) A record for entering the full particulars of cases;
(3) A recipe book wherein all medicines expended are carefully noted;
(4) A clinical chart book in which are recorded the variations of temperature, pulse, and respirations of all cases of any interest.

No operations, however trivial, are performed without the use of chloroform; this is done for two reasons—(*a*) to alleviate suffering, and (*b*) to teach the probationers and the students of the Agricultural College humanity.

During the past six months 72 practical demonstrations were given to the probationers and students, including 13 operations and 19 *post-mortem* examinations, for particulars of which see returns Nos. 1 and 2.

During the seven months under report, 51 cases were treated at the hospital, of which 29 were discharged cured, one relieved, 10 died, 3 remain, and 8 were destroyed, some of which were old and worn out and unfit for further work, while others were hopelessly incurable, and their merciful destruction was a justifiable duty, which, in every instance, was performed by a means which inflicted the least possible suffering, for particulars of which see return No. 3.

It is much to be regretted that a large percentage of the cases were brought for treatment when they were beyond human aid; the consequence was that many of the animals died, and some had to be destroyed as incurable. This was especially the case with those sent in by the presidency magistrates under Act VIII of 1867. I have no doubt but that the results would have been far more satisfactory had the owners sought medical aid in time.

Full advantage was taken of the deaths, and post-mortem examinations were made in every case, partly with a view to discover and illustrate morbid conditions, and partly to teach the students the anatomy of the various organs of the body.

Pharmacy.—In the pharmacy 3,751 doses of medicine for the various forms of cattle disease were sent out up to 31st March 1883 to the districts, of which Kistna had the largest share on account of the serious outbreak of disease which occured there. The doses were put up in tins, to which a label was affixed in English and the Vernaculars of the various districts containing full instructions regarding their use and mode of exhibition.

With few exceptions the drugs employed are indigenous to India, are cheap, and can be procured locally.

This is especially done for the purpose of illustrating to the cattle-owner the benefit which can be derived from a judicious use of the resources they have always at hand in their own bazaars, and to prevent them, as far as possible, from pinning their faith on drugs other than those found in their own country, and not always to be had.

Sanitation.—The sanitary arrangements of the hospital are carried on under the most approved principles. No animals are admitted which are suspected of being affected with a contagious disease, and all stable litter, dressings from wounds, &c., are carefully burnt in one of my cinerators, which is erected at a remote corner of the compound. When a patient dies, or is discharged from the hospital, the stall in which it stood is thoroughly white-washed and disinfected before again being re-occupied.

During the year a considerable number of morbid specimens have been collected for the college museum and are being prepared and set up.

The hospital has a well-wooded compound, about ten acres in extent, with a garden in which the following plants have been grown :—

Guinea-grass	...	...	Panicum jumentorum.
Maize	...	...	Zea Mays.
Chinese sugarcane	...	...	Sorghum saccharatum.
Aloes	...	...	Aloe indica.
Aniseed	...	...	Pimpinella anisum.
Ginger	...	...	Zingiber officinale.
Chillies	...	...	Capsicum Annuum.
Thorn apple	...	...	Datura stramonium.
Turmeric	...	...	Curcuma longa.

The Guinea-grass is grown for use of patients, and the medicinal plants for teaching purposes.

Establishment.—This consists of hospital-keeper, peon and two malies. Their general conduct has, on the whole, been satisfactory.

The veterinary hospital being a new institution, few people beyond Saidápet are aware of its existence, and still fewer are those that know anything about its usefulness, and the almost gratuitous treatment given there. Hence the small number of admissions, other than those from the Government farm, during the year. It is, however, to be hoped that as the existence of this, the only institution of its kind in the presidency, and the advantages afforded by it are more widely known among the public, it will be better patronized to the mutual advantage of owners of stock and the students who are being trained at it.

Experiments have been conducted with the following medicinal agents :—Little's soluble phenyle, Barff's boro-glyceride, chloride of sodium, and an unofficial drug termed Rudrakshum (*Eleocarpus genitras*). With phenyle and boro-glyceride, the results have been well defined and definite ; with chloride of sodium the experiments were not extensive enough to draw any conclusive deductions from, but were sufficiently encouraging to continue them at some future date. For particulars of experiments *see* Appendices Nos. 1 and 2.

The chloride of sodium was given to determine a most important point, viz., to test its value as a preventive as well as a curative agent in the more deadly forms of cattle diseases. The deputy inspector was accordingly directed, in February last, to give salt a fair trial and report on the results. He conducted the experiments in the Kistna district, where there was an extensive outbreak of rinderpest at the time, and considers that the results have so far been satisfactory, and I am convinced that the day will yet come when *common salt* will play an important part in the prevention of cattle diseases, not only in India, but throughout the whole civilized world. With regard to the latter, I am not in a position to give an opinion as to its use, because my experiments with it are not complete, nor have they extended over a sufficiently long period

for me to draw any deductions from them which could be looked upon as correct; therefore will reserve a report on it for some future date.

It may not be out of place to give a brief description of the Rudrakshum above referred to; this is the native name given to a tree technically named the *Eleocarpus genitras*, a member of the natural order Eleocarpaceæ. The part used medicinally is the nut. In March last the Head Assistant Collector of Devála informed me that this nut had been employed in the hills, with good success, by a European coffee planter in cases of rinderpest which occurred on his estate, that the natives of those parts employ it extensively as a specific for that disease, and that the dose of it is one nut of an average size ground to powder and mixed in about a pint of gruel. He further desired me to give a trial to the drug, which I gladly accepted. Rudrakshum nut is regarded in a religious light by the natives, and worn by them on occasions of divine worship. I am told that the same nut is sometimes employed by natives as a specific for epileptic fits. I have, therefore, sent 300 doses of 40 grains each (the average weight of a nut) to each of the districts affected with rinderpest, with a view to test its efficacy.

Educational.—Since my connection with the Agricultural College, I have delivered, up to the end of the official year, 220 lectures, including 58 practical demonstrations on the following subjects:—Zoology, Physiology, Anatomy, Materia Medica, and Therapeutics, Pharmacy, Pathology, Dietetics and Parturition.

The lectures are rendered as simple and interesting as possible by means of models, diagrams and the black-board.

The practical classes are carried on at the hospital, where the students are taught the use of the various instruments, to compound and administer medicine, dress wounds, take clinical observations, perform minor operations, conduct *post-mortem* examinations, shoeing, &c. I find that they take a great interest in the work and make very good assistants. They are somewhat timid at first in handling animals, but that wears off after a time.

Slaughter-houses.—By the kind permission of the President of the Madras Municipal Commission, I have been enabled to inspect, from time to time, all the slaughter-houses within the municipal limits. From November 1882 to the end of the last official year, seventeen inspections were made—Meersaibpett was visited five times, Triplicane and Ráyapuram twice, Choolay and Perambúr four times. The result has been most beneficial both to the public and to my probationers.

The probationers have had ample opportunities of studying the various morbid appearances, and they can now without difficulty distinguish disease; the officers in charge of the slaughter-yards are now also better able to discern between what is health and disease.

There is no doubt but that this system of inspecting slaughter-houses frequently and at uncertain times will, if continued, produce excellent results.

The principal diseases observed in the animals slaughtered are—

(1) Catarthal fever.
(2) Congestion of lungs.
(3) Tape-worm (Tænia).
(4) Amphistomum conicum.
(5) Tuberculosis.

Statistics.—These have, of course, only been compiled from the 1st September 1882, *i.e.*, the first month after I assumed charge of the department. The district visited most severely by cattle plague has been Kistna, where no less than 21,486 attacks were reported, or 2·82 per cent. on the total of its cattle, 60·65 per cent. of which died. Now, if we look at the statistical return marked No. 4, it will be observed that the deaths in cattle stand at 19,590, and sheep at 840. These figures represent only the cases reported to this office, but I am confident many deaths occur which we never hear anything of. At the same time it may not be without some interest to calculate the loss in money which has taken place within the period that these statistics embrace, viz., seven months. If we take the cattle all round at an average, say, of Rs. 10 per head, and the sheep at one rupee, the net loss in money has been Rs. 1,96,740, which is a very serious matter. Kistna alone suffered to the extent of Rs. 1,30,390.

In the Trichinopoly district sheep-pox for a time was somewhat severe, but its progress was promptly checked; not, however, until 60 per cent. of those attacked had died.

Anthrax heads the list as being the most fatal malady, claiming no less than 73·40 per cent. of its victims, sheep-pox follows with a death-rate of 60 per cent., next is rinderpest with 5·994 per cent., and lastly, epizootic aphtha which only kills 12·16 per cent., the average for all diseases being 59·36 on the total of animals attacked, which only shows the necessity there is for a cattle disease prevention department.

From return No. 5 (see appendix) it would appear that disease was at its height in the months of December 1882 and January 1883, during which period there was the least rainfall, when no less than twenty districts in the former and twenty-one in the latter month were

affected. This, I consider, is in a great measure due to the sudden change of the season from wet to dry, and the cold which prevails in those months. This conclusion will be borne out by the fact that disease began to subside as the warmer and more genial weather commenced.

The most prevalent malady has been rinderpest, which visited the presidency no less than forty-six times; epizootic aphtha follows; then comes anthrax, which made its appearance only six times.

It must be observed that the cattle disease statistics received in this office often fail to specify the nature of the disease; hence a separate column has been opened for "cattle-diseases not specified." I am inclined to think that the diseases comprised under this head must probably be anthrax and rinderpest; for these are, especially the former, difficult of detection.

ENCLOSURE No. 4.

RETURN No. 1 showing the operations performed since the opening of the Hospital up to 31st March 1883.

Operations.	NO.
Castrations	6
Puncture of rumen	2
Firing	1
Removal of placenta	1
Do. of mammary tumour	1
Do. of portion of penis and breaking up stricture	1
Puncture of cornea for filaria oculi	1
Total ...	13

ENCLOSURE No. 5.

RETURN No. 2 showing the *Post-mortem* Examinations made since the opening of the Hospital up to 31st March 1883.

Post-mortem Examinations.	NO.
Anthrax	2
Catarrhal fever	1
Cholera (fowl)	1
Hydrophobia	1
Tumour rectal	1
Impaction of omasum	1
Pneumonia	2
Pleuro-pneumonia	1
Anchylosis	1
Fracture, cervical	1
Tuberculosis	1
Ringbone	1
Emphysema of the lungs	1
Poisoning	1
Old and worn out	3
Total ...	19

Enclosure No. 6.

Return No. 3 showing number of cases treated at the Hospital from 1st June 1882 up to 31st March 1883.

No.	Description of Animal.	Disease.	Date of Admission.	Date of Discharge.	Result.	Remarks.
			1882.	1882.		
1	Aden cow	Biliary fever	23rd June ..	8th July ..	Cured.	
2	Donkey	Anchylosis shoulder ..	30th July ..	11th Sept. ..	Destroyed ..	Incurable.
3	Aden cow	Anthrax	9th Aug. ..	12th Aug. ..	Died.	
4	Do.	Biliary fever	14th ,, ..	17th ,, ..	Cured.	
5	Country-bred bullock.	Diarrhœa	18th ,, ..	6th Sept. ..	Do.	
6	Saidápet-bred ewe ..	Catarrhal fever ..	22nd ,, ..	6th ,, ..	Do.	
7	Do. do. ..	Do.	22nd ,, ..	6th ,, ..	Do.	
8	Do. do. ..	Do.	22nd ,, ..	6th ,, ..	Do.	
9	Do. do. ..	Do.	22nd ,, ..	6th ,, ..	Do.	
10	Do. do. ..	Do.	22nd ,, ..	7th ,, ..	Died.	
11	Dorking fowl	Cholera	31st ,, ..	10th ,, ..	Do.	
12	Country-bred dog ..	Hydrophobia	31st ,, ..	3rd ,, ..	Destroyed.	
13	Punganúr bull ..	Catarrhal fever ..	18th Sept. ..	26th ,, ..	Cured.	
14	Aden cow	Do.	21st ,, ..	26th ,, ..	Do.	
15	Do.	Do.	26th ,, ..	1st Oct. ..	Do.	
16	Country-bred bullock.	Pneumonia	30th ,, ..	5th ,, ..	Died.	
17	Hill donkey	Castration	3rd Oct. ..	26th ,, ..	Cured.	
18	High-bred English bullock.	Catarrhal fever ..	5th ,, ..	16th ,, ..	Do.	
19	Country-bred pony ..	Wounds	7th ,, ..	9th ,, ..	Relieved ..	Removed at owner's request.
20	Pegu pony	Sprain	10th ,, ..	4th Nov. ..	Cured.	
21	Do.	Do.	18th ,, ..	14th ,, ..	Do.	
22	Country-bred pony ..	Debility	28th ,, ..	..	Remaining.	
23	Nellore bullock ..	Abscess	31st ,, ..	1st Dec. ..	Cured.	
24	Country-bred pony ..	Wounds	3rd Nov. ..	17th Nov. ..	Do.	
25	Bull-dog	Mange	12th ,, ..	16th Dec. ..	Do.	
26	Australian horse ..	Ringbone	23rd ,, ..	20th ,, ..	Destroyed ..	Incurable.
27	Aden calf	Contusion	24th ,, ..	7th ,, ..	Cured.	
28	Australian horse ..	Wounds	24th ,, ..	20th ,, ..	Do.	
				1883.		
29	Spotted deer	Mange	27th ,, ..	26th Jan. ..	Do.	
				1882.		
30	Aden cow	Fever	29th ,, ..	12th Dec. ..	Do.	
31	Mysore bullock ..	Do.	29th ,, ..	12th ,, ..	Do.	
32	Australian horse ..	Debility	12th Dec. ..	23rd ,, ..	Destroyed ..	Do.
				1883.		
33	Country-bred pony ..	Do.	7th ,, ..	21st Feb. ..	Do. ..	Do.
34	Do. do. ..	Sprain	18th ,, ..	6th Jan. ..	Cured.	
			1883.			
35	Do. do. ..	Debility	6th Jan. ..	27th Mar. ..	Destroyed ..	Do.
36	Pegu pony	Sand crack	11th ,, ..	..	Remaining.	
37	Hill donkey	Castration	9th ,, ..	16th Mar. ..	Cured.	
38	Bull-dog	Tumour, malignant ..	22nd ,, ..	29th ,, ..	Died.	
39	Australian horse ..	Debility	23rd ,, ..	1st Feb. ..	Destroyed ..	Do.
40	Nellore cow	Tuberculosis	20th Feb. ..	9th Mar. ..	Died.	
41	Australian horse ..	Paraplegia (wind stroke).	20th ,, ..	22nd ,, ..	Cured.	
42	Nellore cow	Retention of placenta ..	22nd ,, ..	14th ,, ..	Do.	
43	Mysore bullock ..	Impaction of omasum ..	26th ,, ..	28th ,, ..	Died.	
44	Australian horse ..	Sprain	27th ,, ..	26th ,, ..	Cured.	
45	Country-bred pony ..	Castration	1st March ..	16th ,, ..	Do.	
46	Arab horse	Open-joint	2nd ,, ..		Remaining.	
47	Saidápet ram	Catarrhal fever ..	2nd ,, ..	11th Mar. ..	Cured.	
48	Do. ewe	Pneumonia	8th ,, ..	11th ,, ..	Died.	
49	Australian horse ..	Debility	12th ,, ..	27th ,, ..	Destroyed ..	Do.
50	Do. cow ..	Pleuro-Pneumonia ..	13th ,, ..	24th ,, ..	Died.	
51	Antelope	Fracture	30th ,, ..	31st ,, ..	Do.	

	NO.
Remaining last report	..
Since admitted	51
Cured	29
Relieved	1
Died	10
Destroyed	8
Remaining	3

ENCLOSURE No. 7.

No. 4.—Statistical Return of Cattle Disease in the Presidency of Madras from 1st September 1882 up to 31st March 1883.

Number.	Districts.	Strength of Live Stock.				Number of Animals attacked with					Percentage of Attacks on Strength.
		Cattle.	Goats.	Sheep.	Total.	Rinderpest.	Anthrax.	Epizootic Aphtha.	Sheep-pox.	Total.	
1	2	3	4	5	6	7	8	9	10	11	12
1	Kistna	439,597	127,795	191,903	759,295	21,486	..	..	..	21,486	2·82
2	Kurnool	259,173	98,938	198,649	556,760	3,922	..	..	..	3,922	0·70
3	Vizagapatam	68,623	27,488	15,603	111,714	2,796	179	..	..	2,975	2·66
4	Trichinopoly	450,522	260,169	572,470	1,283,161	938	9	..	1,400	2,347	0·18
5	Coimbatore	531,725	245,653	354,154	1,131,532	856	168	344	..	1,368	0·12
6	Bellary	182,200	89,566	169,122	440,888	944	20	..	..	964	0·21
7	Tinnevelly	403,759	208,170	588,241	1,200,170	455	..	..	..	455	0·03
8	Chingleput	252,119	66,331	140,507	458,957	33	220	50	..	303	0·06
9	South Canara	512,388	9,209	211	521,808	1	27	185	..	213	0·04
10	South Arcot	622,077	261,697	429,130	1,312,904	91	64	..	..	155	0·01
11	Ganjam	174,216	25,768	12,093	212,077	..	57	..	..	111	0·05
12	Godávari	370,958	55,855	45,307	472,120	60	..	..	..	60	0·01
13	Nilgiris	35,300	2,066	430	37,796	10	23	..	..	33	0·09
14	Nellore	235,626	76,952	201,371	513,949	14	..	..	..	14	0·002
15	Anantapur	182,508	98,897	241,250	522,655	8	..	..	..	8	·001
	Total ..	4,720,791	1,654,554	3,160,441	9,535,786	31,614	767	633	1,400	34,414	00·36

Number.	Districts.	Number of Deaths from					Percentage of Deaths on Strength.	Percentage of Deaths on Number of Attacks.				
		Rinderpest.	Anthrax.	Epizootic Aphtha.	Sheep-pox.	Total.		Rinderpest.	Anthrax.	Epizootic Aphtha.	Sheep-pox.	Total.
		13	14	15	16	17	18	19	20	21	22	23
1	Kistna	13,039	..	..	..	13,039	1·72	60·65	..	..	..	60·65
2	Kurnool	2,272	..	..	..	2,272	·41	57·93	..	..	..	57·93
3	Vizagapatam	1,827	124	..	..	1,951	1·74	65·27	69·27	..	..	65·57
4	Trichinopoly	484	9	..	840	1,333	·104	51·58	100·00	..	60·00	56·79
5	Coimbatore	417	138	57	..	612	·054	48·71	82·14	13·66	..	44·73
6	Bellary	460	17	..	..	477	·011	48·73	85·00	..	..	49·48
7	Tinnevelly	305	..	..	..	305	·026	67·19	..	..	..	67·19
8	Chingleput	19	123	..	..	142	·03	57·87	55·90	..	..	53·18
9	South Canara	1	24	14	..	39	.007	100·00	88·22	7·56	..	18·31
10	South Arcot	70	54	..	..	124	·01	76·92	84·37	..	..	80·00
11	Ganjam	..	57	6	..	63	·03	..	100·00	11·11	..	56·75
12	Godávari	34	..	..	..	34	·008	56·66	..	..	..	56·66
13	Nílgiris	10	17	..	..	27	·071	100·00	73·91	..	..	81·81
14	Nellore	4	..	..	..	4	·001	28·50	..	..	..	28·50
15	Anantapur	8	..	..	..	8	·002	100·00	..	..	..	100·00
	Total ..	18,950	563	77	840	20,430	0·215	59·94	73·40	12·16	60·00	59·36

Enclosure No. 8.

No. 5.—Analysis of the "Rainfall and Health of Cattle Statement" from 1st September 1882 up to 31st March 1883.

Month.	Number of Districts affected with.				Total Number of Districts affected.	Average Rainfall in Inches.	Remarks.
	Rinder-pest.	Anthrax.	Epizootic Aphtha.	Cattle Disease not specified.			
September 1882 ..	5	1	4	6	16	4·65	It will be observed that no less than 44 outbreaks were so vaguely reported that no clue could be obtained as to their precise nature which, if statistics are to be kept anything like correct, calls for remedy.
October ,, ..	6	1	4	7	18	4·31	
November ,, ..	6	2	3	8	19	8·78	
December ,, ..	7	1	4	8	20	1·10	
January 1883 ..	8	1	5	7	21	0·11	
February ,, ..	6	..	4	4	14	0·21	
March ,, ..	8	..	3	4	15	0·55	
Total ..	46	6	27	44	123	19·71	

Enclosure No. 9.

Appendix No. 1.—Little's Soluble Phenyle.

It has been extensively experimented with for the last six months.

I am of opinion it is a most valuable disinfectant, deodorizer and antiseptic, and has a peculiar power of checking tympany in cattle by neutralizing the gas contained in the stomach or by arresting the fermentive process which is the cause of its production.

I have no hesitation in saying that, as a disinfectant, it is in no way inferior to the far more costly article, carbolic acid, and has a great advantage over the latter agent by being to an extent non-corrosive and readily soluble in all proportions of cold water; whereas, on the other hand, carbolic acid is highly corrosive and will not mix with cold water, which is decidedly against it.

Internally, it has been largely employed in the districts in the treatment of cattle diseases in doses of 60 minims, and the deputy inspector reports most favorably on it.

Externally, as a dressing to the skin when infested with parasites, it will produce in a short time a most wonderful result. I have seen ticks (*Acarida magna*) leaving the bodies of sheep and dogs like rats deserting a sinking ship. As a dressing of this kind it should be used in the proportion of 1 to 40 or 60 parts of water.

As an application to wounds and ulcers it may be employed mixed with from 30 to 40 parts of water.

For disinfecting and deodorizing purposes it will be found useful, either mixed with white-wash, one ounce to the gallon, or with 80 to 100 parts of water, and freely sprinkled about.

Enclosure No. 10.

Appendix No. 2.—Barff's Boro-Glyceride.

I am of opinion that it is a most valuable antiseptic and from its non-irritating, non-corrosive and soluble nature, it far surpasses either carbolic acid or phenyle, but, on the other hand, it is inferior to those agents as a disinfectant and deodorizer; in fact it has little or no power as either.

As a dressing for wounds and ulcers it is eminently well suited; it brings about rapid granulation; therefore is highly useful as an application where there has been loss of structure or sloughing. It stimulates ulcers and brings about a healthy reaction with subsequent healing of the part.

From its non-poisonous nature I find that it will not destroy maggots, nor will it prevent them entering a wound; therefore when applied to a part, it must be carefully covered with lint or cotton wool.

It being perfectly harmless, enhances its value considerably, because it can be used with the greatest safety by the most inexperienced and ignorant.

It is best used in the crude form laid on as a paste; but for slight wounds, it may be dissolved in from 10 to 15 or 20 parts of water.

At the veterinary hospital it has been applied to all kinds of cases, and I decidedly consider it is a most invaluable antiseptic to wounds, &c., and as an agent for the preservation of morbid specimens.

Enclosure No. 11.

Return showing Number and Results of Experiments with Boro-Glyceride.

—	Strength of Solution.	Open or Closed Vessel.	Date of Submersion.	Date of Removal.	Number of Days.	State.	Remarks.
			1883.	1883.			
1. Shell-fish	1 to 20	Closed.	14th Jan.	21st May.	128	Perfectly fresh.	
2. Vegetables (potato, onion, carrot, turnip and green chilly).	1 to 20	Do.	19th ,,	21st ,,	123	Do.	Coloring matter of the chilly slightly faded.
3. Parasite (lumbrisi) ..	1 to 10	Do.	20th ,,	20th Feb.	31	Decomposed.	This specimen never kept well from the first, although perfectly fresh when submerged.
4. Mutton-chop	1 to 30	Do.	1st Feb.	21st ,,	21	Perfectly fresh.	Was cooked and eaten.
5. Lungs and heart (horse).	1 to 50	Open.	1st ,,	2nd ,,	2	Decomposed.	Difficult to keep owing to the air in the lungs.
6. Foot and fetlock (horse).	1 to 50	Do.	1st ,,	4th ,,	4	Perfectly fresh.	Was taken out daily for dissection.

Enclosure No. 12.—Map.

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

G.O., dated 19th November 1883, Nos. 1430, 1430-A, Revenue.

Read—the following Proceedings of the Board of Revenue, dated 3rd October 1883, No. 2965 :—

Resolution—dated 3rd October 1883, No. 2965.

Submitted to Government.

2. Mr. Robertson's annual report as Agricultural Reporter appears to the Board to contain a great deal of matter that might well have been omitted. They think it would be better if he refrained in future from indulging in the species of generalization to be found at the end of his 33rd paragraph, where he says "a very general belief is springing up that irrigation water is generally far too lavishly used in South Indian Agriculture; but up to the present time no really reliable data have been collected applicable to ordinary conditions." The Board think that Mr. Robertson has much to learn about irrigation from the ryot, and can teach him nothing about it, while they question the general accuracy of his dictum.

3. They are at a loss, too, to follow Mr. Robertson's line of thought when he wrote in paragraph 78 that "of course where milk can be sold at 4 annas per measure, it will not pay to make cheese, even where it is possible to cure cheese." The price of the milk will, doubtless to a great extent, affect the price of the cheese, but if that price includes the cost of the milk and a fair profit, and there is a market at that price, it ought to pay to make cheese.

4. With reference to paragraphs 11 and 12 of the Director's letter forwarding the above report, the Board have since * submitted to Government their proposals for securing the record of the outturn of crops in all villages.

* Board's Proceedings, dated 3rd October 1883, No. 2954.

5. The most interesting enclosure to the Director's letter is the report of Mr. Mills, the Inspector of Cattle Diseases, which shows that much useful and really practical work is being performed by him, short as is the time since his office has been constituted. Many of his remarks are full of interest, but none more so than his statement of his conviction that the day will yet come when common salt will play an important part in the prevention of cattle disease. In the opinion of the Board there is no matter which goes so directly to the root of agricultural success in this country and is so intimately bound up with the prosperity of the ryot as the prevention and cure of cattle disease. The ryot's cattle are the chief part of his agricultural capital, and anything that will prevent the enormous annual loss of cattle from disease which now takes place will not only add greatly to the manure supply of the country, which is the form in which capital most needs to be applied to the soil, but will tend, indirectly perhaps, to improve the breed and enable them to do more work. Intimately connected with this subject is that of the formation of fuel and fodder reserves and grazing grounds to which the Board have recently been devoting much attention, and in connection with which they are now submitting draft rules for the approval of Government framed under Section 26 of the Madras Forest Act.

(True Copies and Extract.)

(Signed) E. GIBSON,
Acting Secretary.

To the Secretary to Government, Revenue Department, with a map.
Copy to the Director of Revenue Settlement and Agriculture.

ORDER—dated 19th November 1883, No. 1430, Revenue.

Miscellaneous.

The Director of Agriculture submits, in the form * prescribed by the Government of India, his report on the operations of his department for the year 1882-83.

* Circular 31-A, dated 14th May 1883.

2. The revision of the settlement has already been completed † in ten, and is in progress in six, of the twenty-one districts of the presidency. The financial results hitherto attained show an increase of Rs. 12,01,580 or 5·8 on the old revenue assessments. The reports of of the Inam and Irrigation Departments will be disposed of in due course. It will suffice here to observe that the Irrigation Revenue Accounts for the nine systems for which capital and revenue accounts are kept have been completed, and that the best method of exhibiting the harvest yield in future both in irrigational and in ordinary agricultural statistics will be dealt with at the Conference which will consider this and cognate subjects at Calcutta in December next. By a typographical error in the statement of accounts the Cauvery system is said to have repaid 118·8 per cent. instead of 1,118·8 per cent., in surplus revenue on the expenditure incurred on improvements. The Government note with great satisfaction that steps are being taken for the more exact determination of the value to the public revenue of the minor irrigation works of the presidency and await with interest the submission of the statistics referred to in paragraph 9 of Mr. Wilson's letter.

† G.O., 27th August 1883, No. 1048.

3. No steps can be taken towards the improvement of the village record system until the results of the deliberations of the Conference referred to above are known. The general views of this Government on the subject have meanwhile been recorded in their Order, No. 1357, dated 3rd November 1883.

In regard to the analysis of districts, the Government are of opinion that Mr. Wilson's proposals are well calculated to effect the object in view as described in paragraph 5 of Mr. Buck's letter of the 14th May last, and they trust that it may be found possible to give effect to them without increasing the ordinary revenue establishments.

4. The chief measures of protection against famine referred to in paragraphs 16 and 17 of the Director's letter—namely the irrigational projects for the districts of Ganjam, Madura and Salem, and the scheme of light railways intended to connect the inland tracts of this presidency, which are most subject to famine, with the sea-coast and the deltas of our principal rivers—have been transferred to the Public Works Department. These works will, in the opinion of the Government, prove of the very highest value to the country in times of scarcity or famine.

5. Whilst the Government agree with the Board in thinking that Mr. Robertson's report might have been somewhat condensed, they are of opinion that it contains much useful and interesting information and they are unable to endorse the criticisms which find expression at paragraphs 2 and 3 of the proceedings read above. It has long been an admitted fact that water supplied by direct flow for irrigation is not economized by the ryots to the same extent as when they have to lift it, and any experiments furnishing reliable data as to the quantity of water necessary to mature a crop under varying conditions of soil and climate will be of great agricultural value. The Government note with satisfaction that arrangements have been made for such experiments being conducted and look forward with interest to the results.

6. The Government have already approved the proposed severance of the School of Agriculture from the Farm and the change will be carried into effect at an early date should no financial objections exist. On the Madras Exhibition ‡ separate orders have been passed. It is hoped that some means will be devised for the destruction of the tobacco parasite which Mr. Lawson has identified as the *Philipœa Indica*. The Government agree with the Director in thinking that no further experiment should be made with *Reana luxurians*, in regard to the value of which as a fodder crop several conflicting opinions have from time to time been received. The live-stock on the farm appears, as Mr. Wilson observes, to be excessive, and its proposed partial distribution among the districts is approved.

‡ G.O., dated 7th November 1883, No. 1373.

7. Experiments might be repeated for the purpose of determining the best way of preserving the vitality of seed of the Minnesota cane, for, as Mr. Robertson observes, the test cannot be satisfactory unless the seed treated is exposed to the same extent to which that of the ordinary agriculturist is, to the action of the air and the possible ravages of insects. Further experiments with *Nankin* cotton have been * ordered. The arrowroot flour referred to in last year's report was sold for $1\frac{1}{2}$ annas a pound. It should be noted what price the product of the current year fetches, for, at this rate, its cultivation can hardly be profitable of itself or by way of example.

* G.O., dated 10th September 1883, No. 1095.

8. Mr. Robertson is of opinion that with proper apparatus a roughly prepared fibre for rope-making might be extracted from the Manilla hemp at a sufficiently low price to pay. As such rope sells in Madras at 5 annas per pound, this seems doubtful; but experiments might be made with the apparatus described by † Mons. de Chazal, should the Superintendent be able to make it up on the farm.

† G.O., dated 28th April 1883, No. 524.

9. The Government entirely agree with the Director in thinking that seed of the varieties of *Eucalyptus* which grow on the farm should be distributed in the districts. There seems no reason why this valuable fuel producer should not do at least as well in other localities as in the indifferent soil of Saidápet. The proposed experimental plantation of *Divi Divi* is approved and the commercial results should be carefully noted.

10. The steady improvement in the Saidápet breed of sheep is satisfactory, and the Government hope that the importance of improving the indigenous breed of sheep by judicious crossing will not be lost sight of.

11. Considerable activity was displayed during the year under report in the introduction and distribution of improved agricultural implements. The Government concur with the Agricultural Reporter and Director in thinking they should now retire from the active business of supplying such as are of recognised utility and confine their attention to the introduction of such as are worthy of trial but not as yet recognised as suitable to the wants of the native cultivator.

12. In view of the important questions of principle now under consideration in connection with the future of the Saidápet farm, the Right Honorable the Governor in Council agrees with Mr. Wilson in thinking that the proposed Erode and Chittoor farms should not be proceeded with.

13. The operations of the Cattle-disease Department are satisfactory and much good work appears already to have been accomplished by Mr. Mills and his assistants. The Government are fully alive to the importance of devising some method whereby salt may be made available as an article of diet for cattle and as a manure without detriment to the revenue, and the subject has quite recently come under their consideration.‡ As observed by Mr. Wilson the difficulty has proved by no means so easy of solution as Mr. Robertson supposes. The inspections of the Madras slaughter-houses by Mr. Mills have doubtless been most useful. Steps should be taken to make the existence of the Veterinary Hospital at Saidápet more generally known.

‡ G.O., dated 26th September 1883, No. 1186.

14. The total expenditure of the year exclusive of the Director's pay was Rs. 77,444. The statement of account and of profit and loss account of the Saidápet farm in paragraph 108 of Mr. Robertson's report, wherein receipts and expenditure are shown as Rs. 10,830, is not clear. It is not stated by whom the valuation of the farm and estate was made. The *boná fide* receipts of the farm proper appear to be Rs. 4,603, being the sum entered less Rs. 990 received for Swedish ploughs bought and sold for Government by the farm. The expenditure on supervision was Rs. 23,285, on the School of Agriculture Rs. 24,843, on the Cattle-disease Department

	RS.
General Supervision	23,285
Saidápet Farm	10,830
School of Agriculture	24,843
Estate Improvements and Repairs ...	2,487
Cattle-disease Inspection	8,809
District Operations	7,190
Total ...	77,444

Rs. 8,809. The expenses of the farm are of course far higher than appear, for the greater portion of the very large sum expended in general supervision is debitable to this head.

15. On the whole, the operations of the year may be considered satisfactory, and now that such difficulties as were unavoidable in the organization of a new department have been surmounted, the Right Honorable the Governor in Council trusts that uninterrupted progress will be made in the directions indicated in the recent Proceedings of Government passing orders on Mr. Wilson's proposals for its future conduct.

(Signed) E. F. WEBSTER,
Secretary to Government.

To the Board of Revenue, with a map.
,, the Director of Agriculture.
,, the Director of Government Cinchona Plantations, &c.
,, the Public Works Department.
,, the Accountant-General.

No. 1430-A.

Copy to the Government of India, Department of Revenue and Agriculture.

(Signed) E. F. WEBSTER,
Secretary to Government.